Ivy L. Lee on Increasing Costs of Operation

ELECTRIC RAILWAY JOURNAL

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Perfect Service
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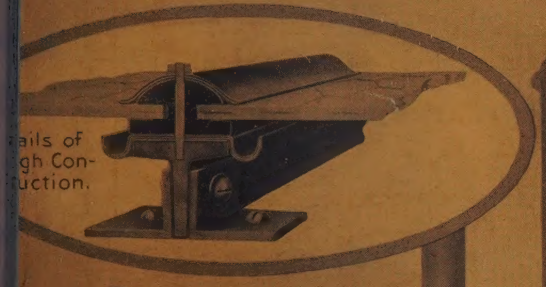

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gh Con-
uction.

This power plant of the Public Service Corporation of N.J. represents an investment of hundreds of thousands of dollars in valuable machinery alone. Waugh Construction was selected for the skylights over this machinery as well as for other "Public Service" plants because it provides perfect, permanent service. Bulletin 56 G describes and illustrates other important structures upon which Waugh Construction is used.

Asbestos Protected Metal Co., Pittsburgh

Preparedness
The Thought of the Hour

"EVERYBODY seems to be doing his bit," exclaimed the General Manager, as he laid the morning paper on his desk, "and we must do ours, too, Joe!"

"Well, boss," replied Joe, "what do you suggest? I'm ready and willing to exert every effort."

"Joe," continued the General Manager, "our latest equipment of Westinghouse No. 506 motors and HLD Control have shown an economy of 15 to 20 per cent compared with our older cars. These new cars make fast schedules—the safety devices have eliminated nearly all the expensive damage claims, and the public is satisfied with the service. The increased receipts on this line prove this.

"What I want you to do is—start in and work up data showing the reduction in operating cost and increased revenue which would result if we retired all our old heavy cars and installed all new low floor cars with Westinghouse No. 506 motors and HLD Control."

"All right, boss," answered Joe, "I will have the dope in about two days. You know the New York State Railways have just ordered 25 new cars with No. 506 motors and HLD Control."

Westinghouse Electric & Manufacturing Company

Sales Offices in All Large American Cities

East Pittsburgh Pennsylvania

PROPERTY OF
JOINT ENGINEERING DEPARTMENT
WISCONSIN TAX AND RAILROAD
COMMISSIONS
MADISON, WIS.

Electric Railway Journal

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RECORDING SERVICE INTERRUPTIONS

In connection with attempts by electric railways to sell power to municipalities and large industries located along their transmission lines it has come to our attention recently, in a couple of instances, that the railway companies involved did not have adequate records in regard to the reliability of their service. In consequence they were unable to state definitely what proportion of their troubles was due to their transmission line or to what extent some line betterments they were proposing would be effective in reducing the number and duration of their service interruptions. Our war preparations are only just beginning, but it is becoming increasingly apparent that before they get well under way our factories as well as our transportation systems will be operating under very high tension. Many of these factories are electrically operated, and if they are to perform their allotted tasks their power supply systems must be kept as free as possible from interruptions. For this they depend upon the central station, so that more care than ever should now be taken to maintain this service unimpaired.

POWER TOOLS TO OFFSET LABOR SHORTAGE

"On a job for which there was need of sixty to seventy-five men only about twenty appeared." This quotation from F. H. Hill's track article in this week's issue is similar to reports received from all parts of the country, especially from properties located near the large munitions works. Mr. Hill shows clearly that part of the solution of the labor-shortage problem is found in applying power tools to track work. In the reconstruction work which he describes, the pneumatic machines for cutting asphalt paving, the oxy-acetylene torch for cutting off old track bolts, the steam shovel for excavating the trench, the pneumatic tie tampers, the self-propelled concrete mixer and other pieces of power apparatus were rushed in to take the place of the missing labor, with the result that the second stretch of track was rebuilt at almost double the speed of the first stretch. Of the power-driven apparatus used on this job the pneumatic asphalt-cutting tools are the most novel. These have been used on only a few jobs, but the trials have proved so successful that they are about to take their place as one of the recognized standard track tools on jobs involving the tearing up of paving. Their use is not limited to asphalt paving, but they may be used to good effect also in tearing out block paving and concrete foundations. While the merits of the steam and the electric shovel have long been recognized for many kinds of excavation work, these tools are not as common on electric railway track work as they should be. The excavation work described by Mr. Hill was done at about the rate of 40 cu. yd. per hour under favorable conditions, while the average cost of excavating and loading the material on wagons was 13 cents per cubic yard. Not long ago the Connecticut Company reported that its engineers had cut the cost of excavation 66 2/3 per cent by the use of an electric shovel, which also effected a saving of 50 per cent in the cost of teams. Figures such as these indicate conditions which warrant a more general use of labor-saving equipment.

THE SACRIFICE OF HABIT

It has been said that the greatest sacrifice that this country will have to make for the war—greater by far than the sacrifice of wealth or comfort—is sacrifice of habit. Whether this is literally true or not, there can be no doubt that the disturbance of orderly routine of life which is even now being forced upon the nation will be sweeping. By far the major part of humanity objects instinctively to change—even to change for the better—when long-standing ideas must be uprooted. This attitude more than any other has prevented the introduction of women conductors on the electric railways of this country in times of labor shortage. While old-style cars were being run and a conductor had to be a combined acrobat, bill collector and police officer, as well as a change clerk, women conductors were an absolute impossibility, but the general introduction of prepayment cars eliminated the three first-mentioned duties. To-day there exists nothing to prevent the employment of women on the rear platform except the mental attitude of a public that has become accustomed to tendering fares on electric cars to men. Under ordinary circumstances this custom would, no doubt, be sufficient to exclude women from the work, but now that the government has taken more than 500,000 men into the Army and Navy and is preparing to draft 1,000,000 more workers from their normal occupations within the next year or two, the public has the alternatives of either sacrificing its habit of mind in regard to male conductors or else doing without conductors entirely. The situation is one that can be very definitely predicted. Even to-day there is not a sufficient supply of male labor properly to man the cars. As further demands are made upon the country's manpower conditions will prove more and more acute, and if male labor cannot be obtained, women must be called upon to fill the depleted ranks. Of course, there is no question that the public will sacrifice its mental habit rather than its car service. Electric railways should be-

gin to break the news to the public now, spreading out opposition over as long a period as possible before the change has actually to be made.

WHEN THE PUBLIC UNDERSTANDS

The Bay State Street Railway seems to have struck a really sympathetic spot in the hearts of its patrons. Its plea for more financial relief has been heeded, and, as we note elsewhere this week, it will probably have a trial period of six months to see what it can accomplish with a general 6-cent fare unit. The Massachusetts Public Service Commission has not yet approved the company's higher schedules, but that is not the fundamentally important even if it is the necessary legal step. The vital point is that the local public —that very public which during the 1916 fare case was so hostile—has become educated to a better understanding of the electric railway situation. The municipal representatives, it should be noticed, have actively cooperated with the company in determining a plan for the trial period. This undoubtedly will impress the commission as a reasonable solution of the company's case. How has all this been accomplished? Simply by adopting a policy of frankly and persistently stating facts and giving evidence of a desire to please the public. There is no royal road to better public relations. But the way is not excessively long or impassable if a utility operator travels it with intelligence and full appreciation of his public responsibility.

SCHOOLING FOR THE PROSPECTIVE MECHANIC

The discussion which has been going on recently in the columns of the *Electrician* of London, England, on the education of apprentices, indicates that conditions in this field in Great Britain are not substantially different from those in our own country. It is very difficult now for a boy to learn a trade in a systematic way, partly because many of the trades are less clearly defined than formerly, and partly because not enough interest is as yet being taken by employers in arranging for the training of boys in such trades as now exist. Our English friends, or at least some of them, believe that boys should, as a rule, leave school at about the end of the grammar grades and go to work under conditions which will stimulate them to learn to think in terms of their daily tasks. The acquiring of useless knowledge is properly deplored, and it is recommended that the studies, to be pursued in shop hours under pay, be in continuation of those begun in school. Such subjects as English, the duty of man to his neighbor and himself, the significant events of history, etc., rather than technical studies, are suggested for these years of adolescence. While we believe thoroughly that a boy headed for the trades should continue through the high school or its equivalent if he is making good use of his opportunities, there are many who would make better progress working under a helpful foreman in a shop. This foreman, however, must have a real interest in the boys' development or they had better be in school. He must have definite plans for them, constituting himself their mentor and friend.

HELP US TELL THE TRUTH

Not long ago the ELECTRIC RAILWAY JOURNAL received an item of interesting information from one of its correspondents concerning the operations of a certain company in an Eastern city, information which was entirely creditable to the management of that company if true. We took the trouble, as we invariably try to do, to approach the company concerned directly to inquire whether the statements set forth in the article were facts. The company immediately replied, with a certain amount of asperity, that the item was partly incorrect and instead of giving the desired information wanted to know from what source we obtained the note.

This experience illustrates an interesting point. Although many companies are making tremendous strides in the development of a publicity policy, some companies still make it extremely difficult for their best friends to tell their story for them. Why should not the management of a company take great pains to tell people of what it is doing? Some managers are inclined to feel as if they were blowing their horn too much if they say much about their affairs. They forget that they are not conducting a personal business. They are, in fact, conducting a quasi-public business—handling funds supplied by the public and rendering a service required by the public. They are therefore required to give an account of their stewardship.

If electric railway managers as a class could really feel deep down in their hearts that the investors in their companies would be pleased above all else at the managers being able to command the confidence of their local communities and the respect and loyalty of their labor, a tremendous change would come over this industry. One of the great difficulties of the business is that so much of the capital in it comes from points outside the community where the capital is used. The business is a local industry, but the capital comes from the money markets of the world. This complication is alike embarrassing to local managers and a constant source of irritation to the local public. Yet it is a fact, inevitable under the circumstances but a fact which should be made an asset with the public rather than a hindrance.

We know of one company which has recently employed a new manager to handle its business in a large city in a neighboring state. The financial backers of his company made this comment upon him: "He is a good, if not a great, operating officer, but above all else, he gains and holds the confidence of the community he serves. You can engage engineering and operating ability in considerable quantity; but the number of managers who really know how to make the public they serve understand them and their company is very, very few."

Does not this situation represent one of the great problems of the electric railway business? Have our managers given enough attention to making their local publics understand them and their companies and their problems? Profoundly as we believe in the fidelity, the courage and the ability with which the electric railways of this country are conducted, we do not believe that

he managers have taken enough account of this absoutely vital factor in the success of their business.

As pointed out on another page, the electric railway ndustry is suffering from an economic disease. Better iving on the part of some railways will help the general ondition, but in the main the disease can be cured by he public alone. It will be thus cured only as the pubic is able to make an accurate diagnosis. The public nust come to realize that the only possible cure for the lisease is to see to it that the electric railways are compensated for the service they render. This lesson in economic pathology is one which can be taught to the public only by the local managers of the electric railways. These men can take no better step in this direcion than by arranging to give accurate information to he press and public concerning every phase of their business in which the public may be interested.

WHERE LOCAL ASSOCIATIONS ARE A GOOD THING

Associations which cover a limited section of territory possess some advantages over national associations n handling certain types of problems and in getting quick action from their members and from public bodies. National associations, on the other hand, can by virtue of their representative character exert powerful influence in matters affecting an industry as a whole. Both kinds of associations will get the best results by dividing their work along natural lines.

The endeavor of national bodies to settle purely state questions was amusingly satirized the other day by a veteran electrical engineer in this fashion: Wamba Wumba, delegate from Zululand, in a paper read at the International Humanitarian Congress, declared that the happiness and well-being of the world would be greatly enhanced if the Zulu practices of living in straw huts, eating cocoanuts and wearing nothing in particular were made universal. Strenuous objection to this course was raised by Kama Kamschatka, delegate from North Siberia. In his experience the best style of habitation was a spherical igloo of pure ice, the best food was whale blubber and, as for clothing, three or four thicknesses of seal skin were absolutely essential. Mr. Wamba Wumba's ideas were absolutely fatuous, to put it mildly. Upon motion of a delegate from Mush, the discussion was postponed until next year's convention, largely to avoid the riot which was impending between the adherents of opposing sides.

To bring the matter closer to home it is obvious that a fog test for insulators, of vital importance in California, would not be of much interest in many parts of the country, hence had best be formulated locally. Again, where joint pole agreements are urgently needed the local interests can get together and put plans into operation while the national bodies are struggling with the general problem. This was done around the Golden Gate, where poles are in joint use with circuits of voltages lower than 5000. Still another illustration is furnished by the action of the Central Electric Railway Association in getting together and acting promptly on certain car equipment standards which were greatly needed. All of which goes to indicate that there is plenty of work for vigorous local electric railway associations. In planning their work, however, these should concentrate attention upon their own specific problems, leaving the broad field for the national bodies.

LOSS OF HOME RULE DOES NOT AFFECT PRESENT CHICAGO ARRANGEMENTS

A few weeks ago the Illinois Supreme Court reached a decision which seemed to transfer the regulatory power over the Chicago Surface Lines from the City Council to the State Public Service Commission. To overthrow this decision, the City Council asked the State Legislature to restore jurisdiction to it. Very recently, however, the bill proposed by the City Council was killed when the House committee on public utilities adjourned without taking a vote thereon. This unquestionably leaves the regulation of Chicago's utilities in the hands of the Illinois commission for at least two years, when it may again be possible to introduce the home-rule bill in the Legislature.

Under this control, what is the effect upon the work of the Board of Supervising Engineers—that body which has so excellently supervised the physical properties and the accounting of the surface railways under the 1907 contracts? The answer, we are authoritatively informed, is "practically no effect." The points over which this board has jurisdiction are carefully defined in the city ordinances and in almost every case will be undisturbed by the activities of the State commission. The questions of rate determination, service regulation and capitalization, which are the fundamentals to which the commission will direct its attention, do not come within the local engineering board's supervisory powers.

It is just and fitting that a city should exercise through experts a direct administrative supervision over a utility when a partnership agreement has been made, but home rule is by no means necessary for this. The traction ordinance in Kansas City was lately developed in the full light of Chicago experience, and here, by means of the city-and-company board of control, it has been shown how under state regulation a municipality can check operation under ordinance rules and maintain a direct contact with operating details, with receipts and expenses, and with renewals, betterments and extensions. The board of control must take cognizance of any pertinent mandates arising from the superior power of the Missouri commission, but this should involve no duplication of work as long as the local board "sticks to its last."

We see no valid reason why the Board of Supervising Engineers and the Illinois commission cannot work together satisfactorily in this way, thus avoiding the decentralization and the political susceptibility of home rule. We believe the arrangement now in effect has material advantages over the regulatory scheme which would have come with a return of home rule to Chicago. For instance, a fare increase might be granted by the State commission, but it is almost beyond hope that a Chicago City Council would ever do this.

Power Tools Speed Up Track Work

Pneumatic Asphalt Cutting Tools and Tie Tampers, Steam Shovel and Self-Propelled Concrete Mixer Called Out to Help Solve the Labor Problem

By FREDERIC H. HILL
General Manager Elmira Water, Light & Railroad Company, Elmira, N. Y.

ELMIRA TRACK RECONSTRUCTION — FIG. 1 — CONDITION OF TRACK AND PAVING BEFORE RECONSTRUCTION

LESS than two months ago the Elmira Water, Light & Railroad Company completed the reconstruction of about 1900 ft. of double track and paving in connection with which there were employed time and labor-saving devices which enabled us to execute the work with unusual speed and at moderate expense.

LOCATION AND EXTENT OF WORK

The work under consideration was on Lake Street and Water Street in the heart of the retail business section of the city. All cars operate over the tracks which were reconstructed, and vehicle traffic on these streets is also very heavy. Due to the location of the work it was of the utmost importance that it should be pushed with all possible speed. While tracks were torn out not only was traffic on all lines interrupted, with the consequent loss in revenue, but also it was necessary to hold a large proportion of our car equipment out of the carhouse, so that the crippling of a car became a serious matter.

On Lake Street the work consisted in relaying about 550 ft. of double track together with a cross-over and a single-track branch-off. The old construction was 8-in. plain girder rail laid on wood ties without ballast, and the paving consisted of sheet asphalt varying in thickness from 2 in. to 3 in. laid on old Belgian block paving without sub-base.

On Water Street the work consisted of relaying about 1400 ft. of double track, a cross-over, a single-track branch-off and a double track steam railroad crossing. The paving on Water Street was of the same general character as that just described for Lake Street, with the exception that for a short distance the asphalt was laid on a concrete base. The old construction here was 7-in. plain girder rail laid on wood ties without ballast.

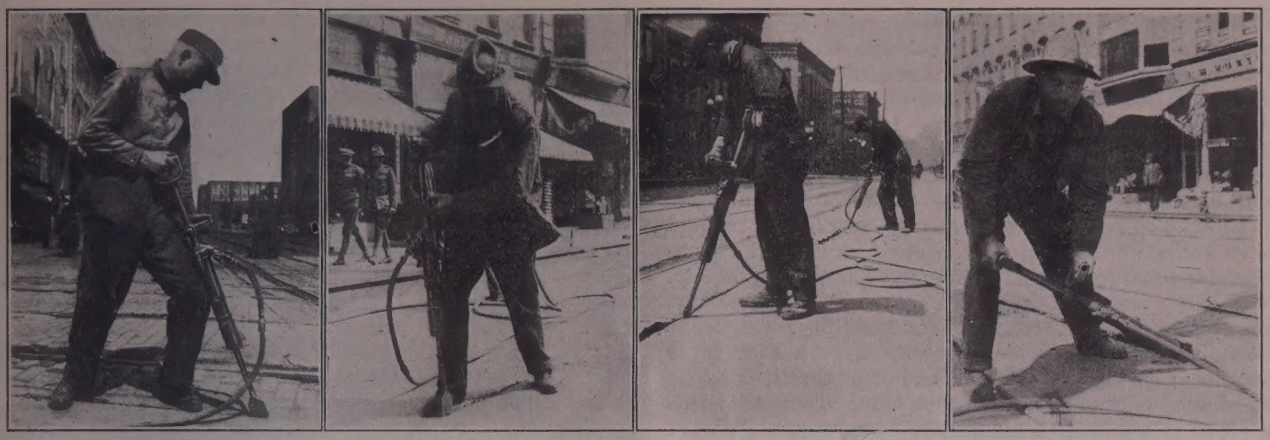
Before any construction was begun, rails, fastenings, ties, paving brick, etc., were distributed along the scene of operations. Rails and ties were distributed from a work car, while two flat cars were used for the 60-ft. rails. The heavy pieces of special work were loaded on a stone drag and hauled to the proper locations by means of a 5-ton motor truck.

The work was begun on Lake Street at 12:30 a.m. Monday, April 2. It had been planned to cut the paving and jack out the track so that excavation could be begun about 7 a.m. On a job for which there was need of sixty to seventy-five men only about twenty appeared, and the progress of getting out track and excavating was so slow that it was most discouraging. The work went on in this manner until Thursday, April 5, when a steam shovel was put to work, and after the men were properly reorganized the work went along very rapidly, so that on Saturday noon, April 7, the excavating was complete. We were further handicapped during this period by cold rains.

It took all the following week to lay rail and repave, so that this section was not completed until Sunday, April 15, a period of fourteen days being required. However, by this time we were well organized with an adequate force of men and tools, and on Sunday at 12.15 a.m. work was begun on Water Street. The condition of the paving before work was begun is shown in Fig. 1, and the work was done in the manner outlined in the following paragraphs.

ASPHALT CUT WITH PNEUMATIC TOOLS

The asphalt paving was first removed from between the rails and for a distance of 24 in. beyond the new line of the outer rails. For this purpose four pneumatic cutting tools were applied in a novel manner. These tools were the standard "Imperial" pneumatic tie tampers, made by the Ingersoll-Rand Company, but they were fitted with special cutting bars, made by changing the shape of the blunt bars used for tamping. This was done by forging the 3-in. by $\frac{5}{8}$-in. face of



ELMIRA TRACK RECONSTRUCTION—FIGS. 2 TO 5—SHOWING PROCESS OF CUTTING ASPHALT WITH PNEUMATIC TOOLS

the tamping bar down to an axe-like cutting edge. Another point of difference between the cutting and tamping bar is that the former has a straight shank, whereas the latter is slightly bent.

In beginning the operation of cutting asphalt a notch or shallow groove was first cut along a chalk line drawn at the proper distance from the outer rails and parallel to them. In making this groove the operator slid the cutting edges along the pavement in front of him, guiding the tool with his knee (Fig. 2). It was found that the workman should be discouraged from guiding the tool with his foot (Fig. 3), as this method is slow and there is danger of the operator inflicting serious injury upon himself. After cutting the groove the operator made a series of deeper cuts, leaving 8 in. to 10 in. between cuts, the groove being depended upon to carry the break across these uncut sections. In making this deeper cut the tool was merely placed in the groove, held about vertical and rocked slightly back and forth (Fig. 4). After a few seconds the tool worked far enough into the pavement to enable it to be used as a pry bar, and an occasional prying action (Fig. 5) loosened considerable pavement.

TIME DATA ON ASPHALT CUTTING

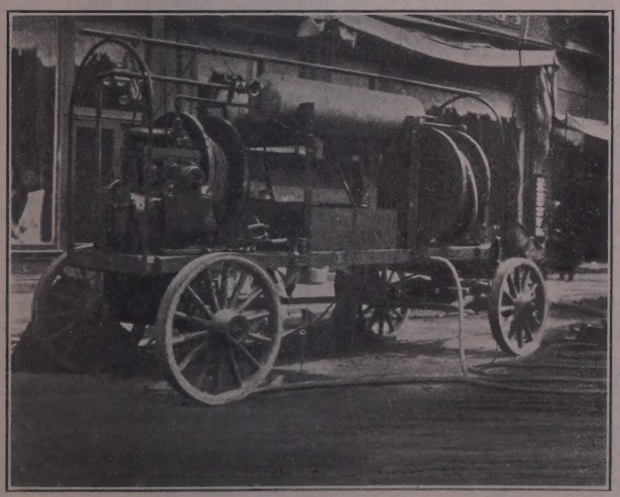
An idea of the cutting speed of these tools can be gained from an observation made while the four tools were in operation, making the outer break in the asphalt. In an hour and one-half a 282-ft. cut was made, which is equivalent to 47 ft. per hour per tool.

In removing the pavement between rails advantage was taken of favorable locations for the cutting, such as along cracks and through thin spots. Good progress was also made by working the tools in pairs. The men faced each other and started the tools down inside of the rails and then pried up simultaneously, thus loosening the pavement from rail to rail. Subsequently the strips were broken up into large chunks. Of course the progress in this varied greatly according to the condition of the pavement, interruptions and the like, but it is safe to say that in a shift of ten hours the average amount of pavement broken up was about 6000 sq. ft. This is equivalent to about 150 sq. ft. per hour per tool. With the aid of a pry-bar the asphalt came up in long strips, which were broken up with mauls into convenient sizes for hand loading.

Where concrete occurred under the asphalt it was cut with the aid of tampers fitted with special picks. These picks were made by tapering and tempering a straight shank similar to that of the asphalt-cutting tools. The concrete was cut along the same line as the asphalt, by holding the tool vertically and rocking it slightly. By inserting the tool at intervals of about 6 in. the concrete was broken up readily. The use of the pneumatic concrete picks was relatively a greater saver of time and labor than for cutting asphalt.

HOME-MADE AIR COMPRESSOR

The air consumption of each pneumatic machine is rated at 16 cu. ft. of free air per minute at a pressure



ELMIRA TRACK RECONSTRUCTION—FIG. 6—HOME-MADE AIR COMPRESSOR

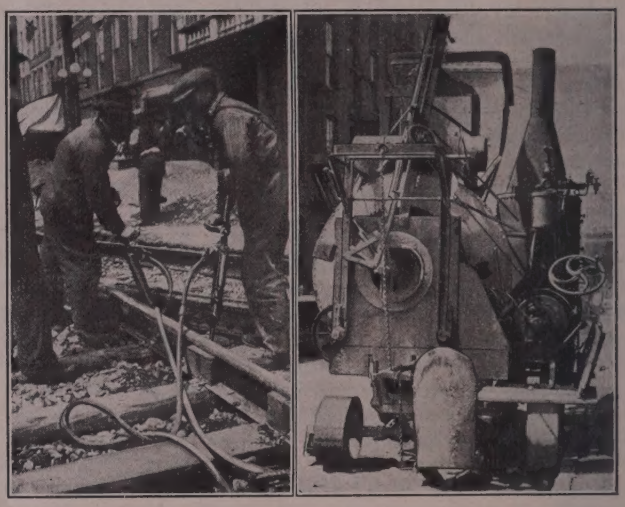
ELMIRA TRACK RECONSTRUCTION—FIG. 7—CONDITION AFTER REMOVAL OF RAILS AND TIES FROM ONE TRACK

of 70 lb. per square inch. Air was supplied by a portable equipment mounted on a horse-drawn truck (Fig. 6). Two complete air compressor units were mounted on the truck. Each unit consisted of a direct-connected, electric-motor-driven compressor of the type used on electric railway cars, an automatic governor, a receiving tank and 300 ft. of rubber hose. Each compressor had a piston displacement of 50 cu. ft. of air per minute. The hose was conveniently handled on two old wire reels, and a tool box located between the compressors provided room for tamping bars, tools, oil, etc.

It was considered advisable to adopt a double-unit compressor plant on account of its flexibility. Our large construction jobs are done mostly in the first three months of spring and summer, and after that it is a case of numerous small maintenance jobs. To handle this work it is planned to mount the compressors on work cars, so that two jobs can be carried on simultaneously. Also one unit can be used to furnish air in the shop and carhouse.

After the asphalt was broken up, rail jacks were used at intervals of about 30 ft., and with these the old track was raised about 1 ft. through the broken paving. The nuts on the joint bolts were cut off with an oxy-acetylene

ELMIRA TRACK RECONSTRUCTION—FIG. 8—STEAM SHOVEL AND STEAM ROLLER AT WORK; STRETCH OF FINISHED TRACK IN FOREGROUND



ELMIRA TRACK RECONSTRUCTION—FIGS. 9 AND 10—TIE TAMPING WITH PNEUMATIC MACHINES; SELF-PROPELLED CONCRETE MIXER

blow-torch, using equipment furnished by the Oxweld-Acetylene Company. An operator and helper were able to cut the twelve bolts in a joint in about ninety seconds. Hand cutting with maul and chisel required six or seven minutes, and the edge of the chisel was soon ruined on account of striking the hard steel lock washers. After the nuts had been cut, the bolts were driven out and the fish plates loosened with mauls. With the track jacked up a few blows with mauls on a tie served to pull the spikes. The old rails and ties were then removed (Fig. 7).

STEAM-SHOVEL EXCAVATING

As soon as the first pair of rails and their ties were removed a gang of shovellers began excavating the trench for the new construction. This trench was 20 ft. wide by 20 in. deep. When sufficient length of trench was excavated in this manner a ½-yd. Thew steam shovel (Fig. 8) was run into position, and from there on all excavation except trimming was done by the shovel, the paving blocks and sub-soil being removed by 2-yd. dump wagons. Laborers followed the shovel, trimming the edges of the cut and grading.

Under favorable conditions it was possible to excavate about 35 ft. of trench 20 ft. wide by 20 in. deep per hour, and the average excavation for a ten-hour day was approximately 250 cu. yd. The cost of excavating and loading into wagons averaged about 13 cents per cubic yard. The material was hauled to a dump over a mile from the job, and the total cost of excavating and hauling averaged slightly more than 50 cents per yard.

As soon as the shovel had moved along about 60 ft. a 10-ton steam roller (Fig. 8) was run into the trench and the sub-soil was rolled in readiness for the ballast. After compacting the bed of the trench, oak ties 6 in. x 8 in. x 8 ft. were placed 2 ft. center to center. The new rails were 7-in. Lorain section No. 91-375. One rail of each track was roughly lined in, bolted and spiked. The other rail was then spiked to gage. The spiking was done by a crew of four men. Two, with bars, held the tie up against the rail and the other two drove the spikes with mauls.

BALLASTING WITH PNEUMATIC TAMPERS

After the spiking was completed the rails were jacked up to grade, leaving space of about 7 in. between the bottom of the ties and the sub-grade. Crushed stone ballast was then shovelled into place and tamped lightly under the ties with shovel and pick. The full length of the ties was tamped with the aid of the same pneumatic tools, which were employed for asphalt and concrete cutting. For this work standard tamping bars with 3-in. by ⅝-in. faces were used with the tools, and the men worked in pairs, one on each side of the tie (Fig. 9). By compacting the ballast from both sides simultaneously none of the force of the blows was spent in shifting the ballast from side to side. Observations made on one section showed that four machines tamped 340 ties in twenty-six consecutive hours. The average time required for two men with the pneumatic tampers to complete the tamping operation of a single tie was from six to seven minutes.

In tamping we operated with a gang of five men. The fifth man sounded the ties and watched the grade to see that the work was properly done. He also gave the necessary attention to the compressor plant and tools. Our observations indicate that this five-man gang will do as much work as twenty-four men with picks, and the tamping is better done.

The total time previously mentioned includes all de-

ELMIRA TRACK RECONSTRUCTION—FIG. 11—CONCRETE FOUNDATION, SAND CUSHION AND SPECIAL FILLER PAVING BLOCKS NEXT TO RAILS ON INSIDE OF TRACK

lays incident to the operation. The work was done during a period of high humidity, and considerable trouble was due to the freezing of the tampers. Numerous delays were also experienced on account of men pulling the hose off the connections at the tool. This difficulty was due to inattention on the part of men, and neither this nor freezing was of serious consequence.

While the ties were being tamped the rails were bonded with a Lincoln bonding machine. Coover track braces placed at intervals of about 20 ft. were bolted and then welded to the rail; the welding insured the security of the brace and also improved the cross bonding. Welds were made, using a carbon pencil and scrap copper. Copper wire cross bonds were placed at the end of each section and around all special work.

SELF-PROPELLED CONCRETE MIXER USED

After tamping the ballast extended halfway up the ties and the roadbed was ready for concreting. Before beginning to place the concrete Nelsonville filler blocks were first laid against the web of the rails on the inside of the track, and then the concrete was placed to cover the ties a depth of 2 in. Crushed stone and cement were distributed along the street on one side and sand on the other in estimated quantities. A self-propelled ½-yd. Ransome concrete mixer (Fig. 10) was used on the same side of the street as the stone. A gang of about thirty men were able to concrete 50 lineal feet or about 1000 sq. ft. per hour. The completed concrete base is shown in Fig. 11.

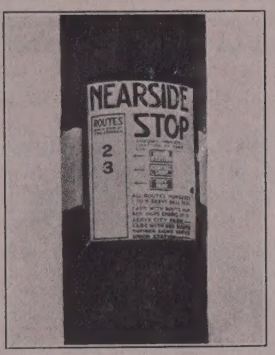
The outside of the T-rails was plastered with cement mortar, and then over the concrete a 1-in. sand cushion was placed. This was rolled with a hand roller and graded, giving a final thickness of about 1 in. The bricks were then laid, using Nelsonville block, next to the filler on the inside of the track. A 5-ton tandem roller was used for final rolling. The spaces between the new pavement and the old asphalt were filled with grout, and pitch was used to fill cracks between bricks. A little sand was sprinkled on the brick and the street was then opened to traffic. A cross-section of the complete construction is shown in Fig. 12.

RESULTS OF USE OF PROPER EQUIPMENT

The advantages of suitable equipment and organization are shown clearly by comparing the progress on Lake Street (550 ft. of double track, one cross-over and one single-track branch-off) where fourteen days were required, and on Water Street (1400 ft. of double track, one cross-over, one single-track branch-off and one double-track crossing) where nineteen days were required. The work was carried out by the company's own organization, augmented by laborers and gang bosses temporarily employed for the job. F. G. Maloney, superintendent of the railroad department, had direct charge of the work.

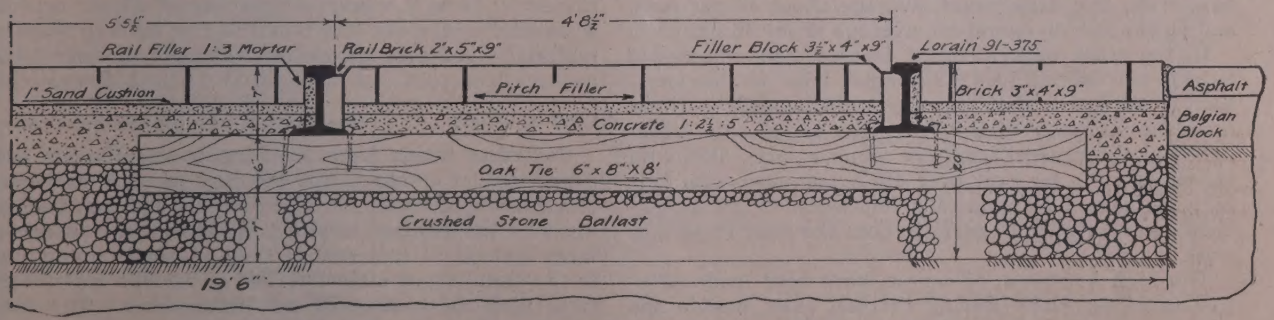
Making the Change to Near-Side Stop Easy for Railway Patrons

A few months ago when the Denver Tramway Company installed the near-side stop throughout the city, it did everything in its power to make this change as easy as possible for the public. In addition to widespread newspaper and company magazine publicity, a white band was painted on the nearest pole at each stopping point. As a still further guide to the riding public, a neatly framed poster was installed on the sidewalk side of each of these poles. This card shows the numbers of the car routes which stop at that location. This was necessary since not all of the cars passing over a certain line stop at every corner. This card gives the number of those routes which do stop at that point and also some general information about what routes run to certain principal points.



NEAR-SIDE STOP POSTER

The Toledo Railways & Light Company, Toledo, Ohio, fittingly observed Flag Day on June 14 by hanging a new American flag, 4 ft. x 2½ ft., on the trolley rope of every one of the 300 cars of the company. As the cars traveled along with the flags waving in the breeze, there was much favorable comment from the people on the streets.



ELMIRA TRACK RECONSTRUCTION—FIG. 12—CROSS-SECTION OF THE NEW CONSTRUCTION

How the Costs of Operation Are Steadily Mounting

Significant Data from Various Parts of the Country Show the Need of Financial Relief for Electric Railways—Business Suffering from an Economic Disaster

By IVY L. LEE

IN the article on this subject last week a general presentation was made of some of the tendencies underlying the street railway business as a whole. It was sought to prove that these tendencies are abnormal and are so undermining the business that, unless heroic measures are taken, inevitable disaster confronts the electric railway industry. No business can continue indefinitely to sell its product at a fixed price if the cost of supplying the product is greater than the price obtained for it.

The point is made in some communities that electric railways are overcapitalized; in others, that the companies have a financial past which is not altogether savory; in others, that the troubles of the companies are due to bad management. It cannot be, however, that these faults are to be found in every company in the country. Yet one may take electric railways almost at random and find the same undermining tendencies at work. Surely this fact indicates that there is something fundamentally wrong with this industry as a business—that the business is suffering from an economic disaster.

The ELECTRIC RAILWAY JOURNAL recently addressed a questionnaire to companies in different parts of the United States, asking for detailed data as to their increased costs of operation. There are published below some significant portions of replies from different parts of the country—sections absolutely independent, surrounded by conditions wholly different, and with stockholders absolutely without relation one to another. These figures show the nature of the economic disease from which the electric railway business is suffering.

A NEW ENGLAND COMPANY

1. The average increase in per cent during the last five-year period, that is, from 1912 to 1917, in:

Cost of Labor:

The increase in the rates of wages granted to various classes of labor since 1912 are practically as follows: Motormen and conductors, 17 per cent; shop men, including car cleaners, average about 35 per cent (this runs from a maximum of 37 per cent granted to common labor to a minimum of 23 per cent granted to painters); line department, average about 40 per cent, and power station operators, average about 38 per cent.

In the track department it is absolutely impossible to give any definite idea, as common labor in this territory is so scarce that the rate paid depends entirely upon the necessity of the job. The actual rate established at the present time for common labor shows an increase of 60 per cent over 1912, but even with this high increase it is practically impossible to get a sufficient supply of men to perform even the most important work.

The high increases, of course, have been made effective more especially during the last year, due to the activity in all branches of industry throughout the territory. Even with these high rates we have not been able to compete with the munitions factories and other profitable industrial enterprises, and have had to take a less efficient class of labor. For that reason the rates do not reflect the actual cost, for while, as might be expected, a less amount of work has been done in certain lines owing to the excess cost of labor and also to shortage of labor, at the same time work performed has not been done in a satisfactory manner, owing to the decreased efficiency of labor as a whole by reason of the high wage payments and also to our inability to compete with the large industries for the most efficient labor in the territory.

Cost of Materials and Supplies:

Something more than a year ago, in anticipation of the very great increase in the cost of material, we laid in an excess quantity of material and supplies, in nearly all instances the quantity being sufficient to cover the requirements for one year. The following is a tabulation of the increased cost of materials used for various purposes:

	Old Price	New Price	Per Cent Increase
Trolley wheel bushings	$0.13	$0.27	108
Track spikes	2.10	3.65	75
Track bolts	2.80	4.75	70
Tie rods	.23	.60	160
English vermillion	.70	4.00	470
Steel wheels	13.50	23.00	70
White lead in oil	6.50	10.50	60
No. 0000 bonding cable	.11	.40	264
General Electric field coils—80	12.51	27.63	120
General Electric armature coils	21.55	34.38	60
Perfection packing	.12	.20	67
Westinghouse field coils—101	20.66	64.03	210
Westinghouse armature coils	23.32	41.02	75
Trolley wire	.19	.38	100
Wire nails	1.50	3.25	116
Machine bolts, discount off list, per cent	75-10	33	200
General Electric 80 gear	$14.13	$28.00	98
General Electric 80 pinion	3.75	8.37	123
Manila rope	.12½	.24	100
Rails	28.00	40.00	43
Rail bonds, per cent discount	40-2½	plus 5	80
Flags	$1.15	$2.00	74

We have tried to select a few items that would cover the general run of materials necessary to use in maintenance of the various items of the company's property. These figures are not the figures at which our stock is carried at present quoted prices. You will note that these run from a minimum increase of 43 per cent to a maximum increase of 470 per cent in various types of material. As near as we can estimate, however, the average increased cost of material is about 60 per cent.

Cost of Fuel:

Contracts which have been made recently for fuel supply are at a rate of 200 per cent increase over contracts made for a similar class of fuel eighteen months ago. In the interim, however, we have had to obtain a large amount of spot coal to keep an ample supply due to the inability, or disinclination, of various contractors to furnish coal arranged for at lower prices. The average increase in the cost of coal during the worst portions

of the year has been 360 per cent. If, however, we are able to obtain fuel supply on the basis of our present contracts the increase would be as shown in these data.

It is only fair to say that in this connection we have spent in the past year more than $1,000,000 in modernizing three of our largest power houses in order that the coal consumption per kilowatt output may be materially reduced. In addition to this, we are now carrying on a very active campaign with our motormen with the view to materially reducing the kilowatt consumption per car-mile operated, in this way hoping to overcome, in a large measure, the tremendous increase in the cost of fuel for power production.

Taxes:

Owing to a change in the tax law of the State, whereby assessment is levied by percentage tax on the gross revenue, we have been fortunate in obtaining a slight decrease in tax payment, amounting to 6 per cent. If, however, there is included as a tax obligations put on the company's property for public improvements, such as renewal and reconstruction of pavement, contributions to new bridges, etc., payments for taxes will be materially increased.

2. Figures showing how the part of the nickel covering the total cost of operation has increased in the last five years.

The best statements as to the decrease in the value of the nickel is shown by the increase in the operating ratio, not including taxes, this ratio having risen from 63.66 per cent in 1912 to 68.51 per cent in 1916, an increase of 7.6 per cent. It is needless to say that during this period the efforts of every individual connected with the property have been given to the problem of reducing operating costs.

3. Estimates of losses from jitneys and private automobiles.

It is impossible to estimate this item in a territory such as that covered by this company's property. The jitneys are, without doubt, taking a large portion of our revenue. They are showing a constant increase, there being at the present time 562 jitneys in operation in various cities in this territory as compared to an average of 379 for the year ended April 8, 1916, which is the first year they were in operation on this company's property. Of course, there is a tremendous increase in the number of small automobiles throughout the territory.

AN EASTERN COMPANY

1. The average increase in per cent during the last five-year period, that is, from 1912 to 1917, in:

Cost of labor (platform), 27 per cent in rate per hour; cost of materials and supplies, estimated average increase between 40 per cent and 50 per cent; cost of fuel (power house steaming coal), 73 per cent advance in price per ton; taxes, licenses, etc.: In 1912 they amounted to 9.28 per cent of total operating revenue, in 1916 they amounted to 10.03 per cent of total operating revenue.

Special Expenses Due to Regulation:

The Public Service Commission during the last three years, either by suggestions to the company's officers or after hearing, has ordered improvements which it is estimated have cost the company approximately $750,000.

Cost of Acquiring New Capital:

The rate of interest has not changed materially, but the purchasing power of the money has been shrinking to such an extent as to make increased capital necessary to accomplish a given amount of work. Therefore, the cost of acquiring new capital may be measured in the terms of this increase. *Illustration:* In round numbers, a complete car could be purchased in 1912 for about $5,000, whereas the purchase price to-day for practically the same car is about $8,000.

2. Figures showing how the part of the nickel covering the total cost of operation has increased in the last five years.

Percentage of operating expenses to gross earnings (including depreciation): in 1912, 50.14 per cent; in 1916, 51.08 per cent.

3. Estimates of losses from jitneys and private automobiles.

Jitney traffic started in this city early in 1915. It is estimated that the receipts of the competitive jitneys have, during the last two years, amounted to approximately $150,000, and it is further estimated that approximately $125,000 of this would have come to the railway had it not been for the advent of the jitney.

Private pleasure autos in this city are estimated at 20,000. Assume an estimated diversion of receipts amounting to 20 cents per day from each of these. The estimated total effect per year would be $1,460,000. The total estimated additional amount which the company might have received per year during the last two years, if there had been no competition from jitneys or privately owned pleasure automobiles, is calculated at $1,601,250.

4. Estimate of added burdens under war conditions.

A recent contribution arising under war conditions was $10,000. Salaries being paid former employees who have entered government service is now about $40,000 a year, and the amount is growing daily. Expenses incident to added precautions in the protection of the company's properties will probably amount to $10,000 per year.

The extra expense and inconvenience which we are being subjected to as a result of war conditions, owing to employees entering government service, freight embargoes, deferred deliveries of materials, etc., amount to considerable, but the figure is not readily susceptible of calculation.

A MISSISSIPPI VALLEY COMPANY

1. The average increase in per cent during the last five-year period, that is, from 1912 to 1917, in:

Cost of Labor:

The wages of trainmen have increased 16.59 per cent from 1912 to 1917. During the same period the wages of track department employees have increased 15 per cent.

Cost of Material and Supplies:

	Per Cent		Per Cent
Cement	38	Steel castings	94
Sand	20	Malleable castings	100
Ties	22	Strip brass	216
Rail	20	Babbitt metal	15
Spikes	68.5	Solder	30
Tool steel	78.5	White lead	82
Magnet wire	150	Linseed oil	140
Tape	7	Turpentine	38
Canvas	82	Trolley cord	45.5
Glass	160	Paper stock for printing transfers	48
Trolley poles	58	Wood pole (line poles)	35
Galvanized wire	75 to 100	Iron pole (line poles)	81
Trolley wire	158		
Lumber	25 to 30		

The cost of other supplies has increased proportionately but those cited indicated the trend of prices.

Cost of Fuel:

The average price of coal for the year 1916 increased 23 per cent over that of 1912. For the five winter months ending March 31, 1917, the average price of coal was 104 per cent greater than that for the year 1912.

Taxes:

Taxes for the year 1916 increased 15.03 per cent over the year 1912.

Cost of Acquiring New Capital:

Under the financial conditions from 1912 to 1917 it was impossible to procure new capital for investment in this company. All additions and improvements to the property have been paid for out of the earnings of the property.

2. Figures showing how the part of the nickel covering the total cost of operation has increased in the last five years.

	1916, Per Cent	1912, Per Cent
Gross operating revenue	100	100
Operating expenses (including depreciation)	65	63.38
Taxes	6.50	5.32
Interest charges (bonds)	20	22.01
Miscellaneous	2.13	.52
Net income	6.37	8.77

The operating expenses (including depreciation) for the year 1916 increased 5.82 per cent compared with the year 1912.

The average fare per passenger for the year 1912 was 3.38 cents and 3.22 cents for 1916, a decrease of 0.16 cent or 4.7 per cent.

3. Estimates of losses from jitneys and private automobiles.

In this city the jitneys are probably not earning more than $500 per day. We have lost in receipts, owing to the increasing use of private automobiles, from $3,000 to $4,000 per day.

4. Estimate of added burdens under war conditions.

We consider the war conditions responsible for the present high prices of all materials. The present agitation for enlistment is making it very difficult to hold our skilled men and to get new men. The abnormal conditions on account of feverish activity in certain lines has largely robbed us of our skilled men, and has created a feeling of unrest among all of our employees.

A NORTHWESTERN COMPANY

1. The average increase in per cent during the last five-year period, that is, from 1912 to 1917, in:

Cost of Labor:

The average daily wage paid all employees of all departments of this company during the year 1916 was 22.3 per cent greater than during the year 1912. For employees in the transportation, rolling stock, and way and structures departments, the average daily wage in 1916 was 20 per cent in excess of the average wage in 1912. The average wage of trainmen during the first three months of 1917 was 14 per cent in excess of the average wage during the first three months of 1916. The wages of all other employees increased by approximately the same percentage during this period.

Cost of Material and Supplies:

Items constituting approximately 90 per cent of the total purchases made for the railway department during 1915 show that $1,000 worth of supplies purchased in 1915 could have been purchased in 1910 for $775, and would have cost in April, 1916, and December, 1916, $1,180 and $1,410 respectively.

Cost of Fuel:

It is not possible to give a very accurate figure covering the cost of fuel during the years 1912 to 1916, inclusive, as the conditions under which our fuel has been purchased have been changed from time to time. At the present time, however, our coal is costing us 59.8 per cent more than it did last year, and we estimate that this will increase the cost per kilowatt-hour for current used by the railway by about 36 per cent. The figures shown in the table under Question No. 2 do not indicate the full effect of this increase in the cost of power, as during the earlier months of this year we were using coal which had been purchased on earlier and more favorable contracts.

Taxes:

The taxes paid in 1916 were 36.8 per cent greater than those paid in 1912. During this period the tax rate increased 24.8 per cent, the balance of the increase in taxes being due to increase in assessment.

2. Figures showing how the part of the nickel covering the total cost of operation has increased in the last five years.

	Calendar Years, First Three Months		
	1912, Per Cent	1916, Per Cent	1917, Per Cent
Operating revenue	100.0	100.0	100.0
Ordinary operating expenses (including depreciation)	61.8	67.0	74.1
Taxes	7.0	6.5	7.0
Amount available for return on investment	31.2	26.5	18.9

From 1912 to 1916 the amount available for return on investment decreased from $0.312 per dollar of revenue to $0.265 per dollar of revenue, or by about 15 per cent. The first three months of 1917 showed a further decrease in the amount available for return on investment to $0.189 per dollar of revenue, and bearing in mind the fact that during the first part of the year certain materials were purchased on 1916 contracts, and the further fact that the full effect of wage increases has not yet been felt, it seems to us likely that the amount available for return on investment for the calendar year 1917 will be substantially less than $0.189, and not unlikely as low as $0.150.

3. Estimates of losses from jitneys and private automobiles.

During the year 1915 the losses due to competition from jitneys were probably in the neighborhood of $500 a day. At the present time losses due to jitney competition are probably about the same in amount as they were during 1916, or somewhat less than in 1915. The increasing use of private automobiles has, we believe, increased the total loss due to the operation of motor vehicles to an amount in excess of what it was in 1915. The latest available figures which we have indicate a yearly loss, due both to jitneys and private automobiles, amounting to between $800,000 and $1,000,000 a year.

4. Estimate of added burdens under war conditions.

High prices of labor and materials are probably to a considerable extent due to the war, and we anticipate that these prices will probably be further increased in the coming months. The high wages offered semi-skilled workmen in the mechanical trades and the unusual advantages offered to agricultural labor are serving both to limit the number of men seeking em-

ployment and to cause some of our older employees to leave the service. Up to the present time we have not lost any considerable number of trainmen by enlistment. It is likely, however, that within a few months the situation will have developed so that a considerable percentage of the men will have entered military service. This, together with the fact that the mechanical trades are offering large inducements, serves to decrease both the quantity and quality of available labor. We also anticipate serious burdens from special taxes.

A COMPANY IN THE MIDDLE WEST

1. The average increase in per cent during the last five-year period, that is, from 1912 to 1917, in:

Wages of car men have advanced approximately 25 per cent from 1912 to 1917; wages of trackmen, 44½ per cent, and wages of shopmen and car men, 40 per cent, Fuel costs have advanced 200 per cent in the last five years. The increase in taxes has been 79.99 per cent. The cost of acquiring new capital in the last five years has advanced 5½ per cent.

2. Figures showing how the part of the nickel covering the total cost of operation has increased in the last five years.

The operating ratio in 1912 was 70.50, and in 1916 58.30. This apparent anomaly is due largely to the increased density of the riding population and to peculiar local conditions obtaining in the years mentioned.

A PACIFIC COAST COMPANY

1. The average increase in per cent during the last five-year period, that is, from 1912 to 1917, in:

Cost of labor, 9.37 per cent; cost of materials and supplies, 20 per cent; cost of fuel, negligible; taxes, 15 per cent; special expenses due to regulation, 53 per cent; cost of acquiring new capital, none obtained.

2. Figures showing how the part of the nickel covering the total cost of operation has increased in the last five years.

The average increase in total operating expenses to total revenues has been 8.1 per cent.

3. Estimates of losses from jitneys and private automobiles.

These losses have been 25 per cent.

4. Estimates of added burdens under war conditions.

No percentages are available, but the following items figure in these added burdens: Employees joining colors; inability to secure competent men to take their places; wage increases; increased cost of materials and supplies; car shortage, which has crippled normal freight movement.

A SOUTHERN COMPANY

1. The average increase in per cent during the last five-year period, that is, from 1912 to 1917, in:

The cost of labor is 30 per cent greater now than five years ago. Our own costs are controlled not only by prices of crude materials, but also by our degree of alertness toward favorable market conditions. Being consumers, our materials and supplies may reveal cost figures quite different from those of other consumers, the element of timely buying being one of considerable importance here. The following rough percentages of increase have been deduced from our own experience:

Copper wire is 50 per cent over the 1912 price, though it was rather high that year; car wheels show a 5 per cent increase, which came on us just this year; brake-shoes, 200 per cent increase, recorded during the last twelve months; motor repair parts, controller parts, lamp parts, etc., about 40 per cent; creosoted pine poles, 75 per cent increase; chestnut poles, 30 per cent increase; steel rails, more than 30 per cent increase; fastenings and points, 75 per cent; lumber, 25 per cent; pole-line hardware, 45 per cent; trucks, 50 per cent; motors, 50 per cent.

We have been protected by contracts on fuel cost, which is a small item with this company, our power being hydroelectric. Due to car shortage in recent months, however, we have had to go into the open market for some fuel and have been compelled to pay as high as 100 per cent increase.

Our tax payments are 36 per cent higher now than five years ago. This will be increased, of course, by war taxes not yet levied.

2. Figures showing how the part of the nickel covering the total cost of operation has increased in the last five years.

Our operating costs have gone from about 50 per cent of our gross income from street railways to about 60 per cent—exclusive, of course, of taxes and interest.

3. Estimates of losses from jitneys and private automobiles.

Losses in receipts, due to jitneys and private automobiles, are estimated at not less than $1,000 a day.

New York Annual Meeting

The New York Electric Railway Association Holds Brief Session and Listens to Discussion on Higher Fares

IN accordance with the practice being followed by other electric railway associations, the New York Electric Railway Association decided some weeks ago not to hold a two-day annual meeting of the usual kind. Instead, the members met at the Hotel Astor, New York, on the morning of June 27 and finished its annual meeting in about an hour. After the regular meeting, Joseph K. Choate, chairman of the committee on higher fares, and Thomas Conway, Jr., Ph.D., of the University of Pennsylvania, Philadelphia, addressed the members of the association on the kind of data which would be required in completing the case which the railways will present to the Public Service Commission, Second District, in their plea for higher fares.

At the regular meeting of the association, a vote was passed authorizing the continuance of the regular committees of the association.

Secretary and Treasurer W. F. Stanton reported cash on hand at the beginning of the year, $3,084; received during the year, $7,452; disbursements, $6,265; balance on June 27, 1917, $4,270.

The committee on nominations, consisting of six past-presidents of the association, presented the following nominations, which received the unanimous approval of the members.

President, Wilbur C. Fisk, president and general manager Hudson & Manhattan Railroad, New York.

First vice-president, Charles F. Hewitt, general manager United Traction Company, Albany, N. Y.

Second vice-president, E. A. Maher, Jr., assistant general manager Third Avenue Railway, New York.

Executive committee: W. O. Wood, Long Island City; T. C. Cherry, Syracuse; H. B. Weatherwax, Albany, and James E. Hewes, Rensselaer, N. Y.

The only paper presented at the meeting was the

annual address of the retiring president. An abstract of this address is given in the following paragraphs:

Address of President Barnes

The New York Electric Railway Association is holding this its thirty-fifth annual meeting under the most critical conditions that our country and our industry have ever seen. For the first time within the association's experience of our present membership our country is confronted with war, and war under such conditions as it has never seen, even during Revolutionary days. Corporate and patriotic duties confront each one of us with an intensity and variety such as to leave room for little else, and least of all for the social and light-hearted features with which we have been accustomed to surround our annual conventions. With this thought in mind, your executive committee has felt that the usual annual convention of this association would be out of keeping with the spirit of the times and has decreed instead a brief business meeting for the single purpose of continuing the life and enlarging the usefulness of our association from a strictly professional standpoint. As the meeting is to be brief, so will your president's address be, confining itself merely to a review of the important features of the association year just completed.

Considering first the activities of the association which are directed toward the problems of the nation, your committee on military operation, which reported so splendidly and effectively at the Niagara Falls convention a year ago, has been continued, and the services of your association have through this committee been offered to the National and State governments, and in co-operation with the American Electric Railway Association and other sectional associations to whatever extent and in whatever direction our association or its membership may be used. It will interest you to know that the officials of the Home Defense Board of the State of New York, who are concerned with any transportation problems which may confront the State administration, have expressed interest and gratification in the data which your association has compiled and have announced their intention of availing themselves of the operating organizations of your member companies should the occasion require.

Your committee on standards has accomplished much of a formulative nature in co-operation with the committee on standards of the American Electric Railway Engineering Association and should in the course of the next year be able to report definite recommendations of great value to the member companies.

The committee on taxation and rates of fare has found itself through the logic of circumstances superseded by the work of a committee under the chairmanship of your past-president, Joseph K. Choate, inaugurated through the agency of your association but extended to include non-member companies. This committee has already filed petitions with the Public Service Commissions, setting forth the need of increased revenues and petitioning for the right to make additional charge for service. Predictions as to the outcome are idle, but if thorough, earnest and conscientious effort can achieve the result, then this committee will work out the salvation of our industry in New York State.

As time goes on, and as this country is drawn more closely into the conduct of the great war, new problems will arise to confront the industry. Already many of our men from all branches of the service have answered their country's call, and the problem of filling the ranks of our workers is becoming daily a more difficult one. We must soon, if we do not already, confront the problem of choosing our policies as companies in this important question of keeping full the ranks of our workers so as to serve our resident population in the best possible manner under the changed conditions which we are entering. The use of women in various branches of the service must have our careful consideration, and this consideration should be early, so that when the necessity arises a definite policy as to this employment may be announced. A uniformity of policy among all companies in this matter would be highly desirable.

As we go daily more deeply into the rapidly changing problems which confront us, let us not forget that association and discussion among ourselves is one of the surest means to an understanding and wise solution of our problems; and let us here resolve that the New York Electric Railway Association shall be now, more than ever before, dedicated to its purpose of making us, by interchange of opinion and by investigation and discussion, not only better railroad men but better Americans.

How the War Will Affect Utilities

Henry G. Bradlee Says that Present Situation Will Require All the Ingenuity of Utilities to Meet It Successfully—Suggests Women Operators and One-Man Cars

An analysis of the situation facing public utilities has been made by Henry G. Bradlee, president Stone & Webster Management Association, Boston, Mass. Summarizing the conditions which he believes will prevail during the war, Mr. Bradlee, in the June issue of the *Stone & Webster Journal*, says in part:

"It appears that we may have for the first time in our experience, and continuing during the entire period of the war, a combination of conditions somewhat as follows:

"1. An unprecedented shortage of labor, materials and supplies, and consequently an abnormally high price for those actually available.

"2. No new capital available for extensions and additions to property.

"3. A condition of general industrial activity and prosperity with consequent demands for additional service.

"It is difficult to imagine a more difficult combination of circumstances for a public utility, and it will require the combined ingenuity of the utilities to meet this situation successfully and furnish satisfactory service to the public. The utilities must devise ways and means to hold down their demands for labor and capital, and above all they must, if possible, find some way to provide for increases in business without making any material increase in plant."

Besides urging companies to make a careful study of the most effective use of employees to make up draft deficiencies and to discontinue all operations which can be dispensed with without loss of efficiency or impairment of service, Mr. Bradlee makes the following suggestions:

"The employment of women in the place of men who enter the army or leave for any other cause should be carefully considered. Experience in England and in Canada shows that women may be employed to great advantage in many departments of public utility work. They have been found particularly efficient, it is said, in some of the lighter mechanical work—for example, meter repairs and adjustments.

"The increase of one-man operation of cars should everywhere be encouraged. In England women have been very generally substituted for men as conductors, and it is understood that they are also being used successfully as motormen. In this country one-man opera-

tion is already started and has demonstrated its possibilities even on large double-truck cars. We are satisfied that all street railways will gradually change to one-man operation for most, if not all, of their business, and by so doing will be able to improve materially the service rendered the public. Such change at this time will meet our present needs and will be in line with probable future development. One-man operation may, therefore, be considered far preferable to the use of women as conductors.

"An effort should be made to decrease the peak demand on public utility plants and to increase the load factor. As the war progresses, the public will obtain a much clearer knowledge of the needs of the situation, and undoubtedly the utility companies will be able to secure the co-operation of their customers and of the public authorities in their efforts to readjust the demand for peak-load service.

"Renewals and replacements will have to be postponed in so far as this can be done without serious detriment to the service and without permanent injury to the property. This should be done because the cost of all such work at this time is excessive and because the surplus which the utility companies are able to accumulate from earnings may be the only fund on which they can draw for absolutely necessary additions to the property.

"Careful consideration should be given to the study of rates. With the constantly increasing costs of all labor, materials and supplies, general increases in rates may be necessary to permit the companies to carry on business and serve the public. The necessity for an increase in street railway fares is now being urged in many sections of the country, and the public is beginning to realize that some readjustment must be made or service will be seriously impaired."

Non-Telescoping Car for the Erie

Provision Against Disastrous Effects of Collisions Has Been Made by Tying the Sides Together at Floor and Roof with Heavy Plates Connected by Vertical Beams, Making a Complete Box Frame for Either End of the Car

A NEW design of all-steel car recently built for the Erie Railroad presents an especially interesting study because of the notable advance in structural strength that has been effected, the car body having been designed with particular reference to resisting destruction in collision or derailment. This is accomplished by the introduction of two new members in the body end, namely, an anti-telescoping tie member consisting of a heavy plate extending across the car from side wall to side wall and about 5 ft. 6 in. lengthwise of the car, and forming a flat ceiling for the lavatory, passageway and saloon, together with special end-door posts in the form of vertical 21-in. beams. These beams illustrate the manner in which the anti-telescoping plate ties the side walls together at the roof line, and how the heavy door post beams and their backing constitute at each end of the car an anti-telescoping bulkhead of great strength and serve to intercept a colliding body. The vestibules of the Erie cars are of the usual construction and are obviously less capable of resisting impact shock than is the heavy body-end construction. Consequently, if the Erie car is subjected to a violent collision, the vestibule structure may be expected to close up against the body of the car and in doing so somewhat cushion the force of the blow.

Further progress of the colliding body will be greatly

NON-TELESCOPING CAR—EXTERIOR VIEW, SHOWING GENERAL FEATURES

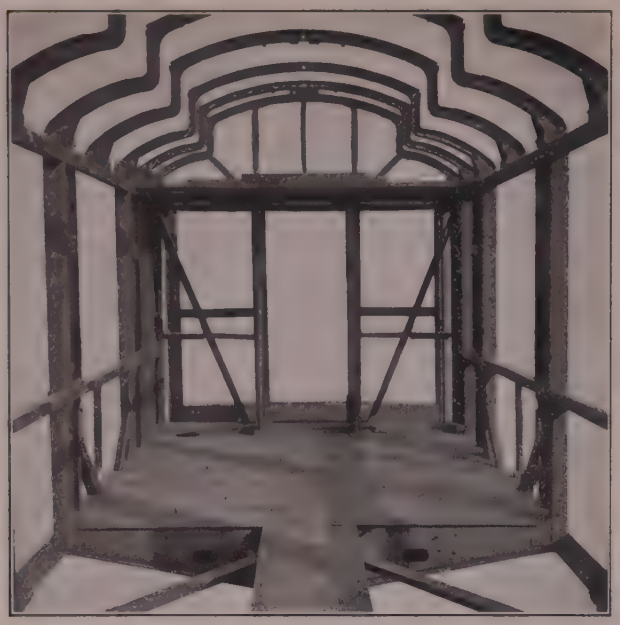
are thoroughly framed into the center sills and to the anti-telescoping plate above with connections capable of developing the full strength of the beam.

The truss-side-frame construction, which has been used, affords in itself much greater security in the passenger space than is possible with the usual side-girder construction with light side posts and roof, and when to this construction are added the new features incorporated in the latest Erie cars, the result is a structure providing far greater protection against telescoping of the car body than any heretofore produced.

In one of the illustrations on page 1186 the arrangement of the protective members is clearly shown. This is a reproduction of a perspective drawing made to

checked, if not arrested, by the heavy end construction, and it is confidently expected that the anti-telescoping bulkhead, if generally adopted, will very greatly reduce, if not eliminate, that most common and most destructive feature of collisions—the telescoping of one car by one of its neighbors.

This design is the result of six years' study of the effect of collision or derailment upon cars—particularly all-steel cars—through personal inspections and examinations of photographic records. The inevitable conclusion from examination of such a series of photographic records as are preserved, for example, by the Interstate Commerce Commission, is that the heavy underframe so generally used in steel passenger cars not



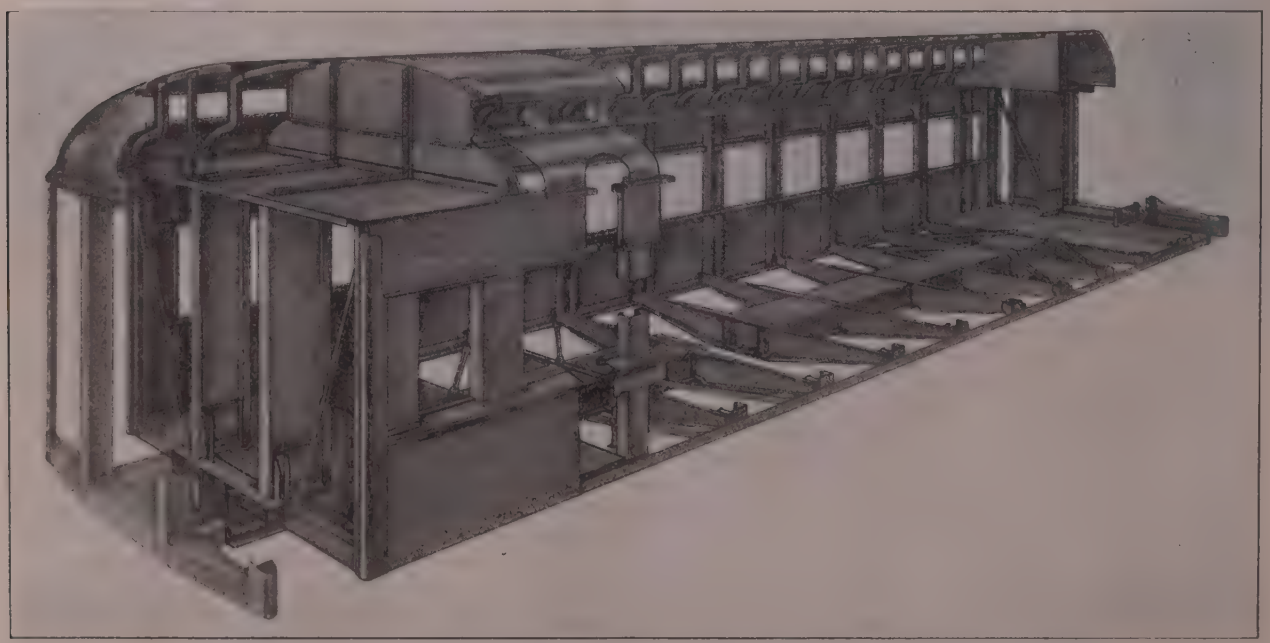
NON-TELESCOPING CAR—INTERIOR VIEWS OF END REINFORCEMENT WHEN UNDER CONSTRUCTION AND IN COMPLETED CAR

only affords little protection against damage in derailment or collision, but in themselves not infrequently increase the damage to life and property, owing to their excessive weight. In case of collision the underframe of at least one car is usually raised at one end above the floor of the adjoining car and, when this occurs, the greater weight and strength of the underframe, as compared to the superstructure of the neighboring car, makes it particularly effective in destroying that superstructure.

This characteristic failure of superstructure when subjected to collision shock has been recognized for several years, and it is to prevent or minimize this destruction, caused by the penetration of one car body within another, that the system of body end reinforcement of the superstructure, as adopted by the Erie Railroad Company has been devised.

The additional weight of material incorporated in this heavy body-end structure is more than offset by the reduction in weight effected elsewhere by the truss-side construction. The complete weight of the car, including trucks but excluding lighting equipment, is only 111,000 lb.—materially less than the weight of the wooden cars with steel underframes now used by the Erie. The length is 78 ft.

For the new cars the framing system is similar to that employed in the Erie suburban cars described in the ELECTRIC RAILWAY JOURNAL for June 12, 1915, except that the windows are rectangular, whereas the window openings of the suburban cars are Gothic. In each case, however, the side sheathing, posts and letterboards, composing the full height of the side walls, are framed together into a truss and act as a load-carrying member. This form of construction produces a structure free from appreciable deflection and without tendency to "work" at joints.



NON-TELESCOPING CAR—CONVENTIONAL REPRESENTATION OF REINFORCEMENT AT CAR ENDS

At the bottom of the side frame of the car is an angle side sill 4 in. x 3½ in. x ⅜ in. The main side posts, or piers, are on approximately 5-ft. 11-in. centers. These piers are "C"-shaped pressings, 12 in. wide x 4⅞ in. deep. The upper member of the side frame, corresponding to the letterboard, is a pressed channel 5¼ in. x 3/16 in. The bracing of the piers is accomplished by riveting to the side sheathing and to the belt rail below the windows, and by the letterboard and upper belt rail above the windows. This method of construction produces a load-carrying truss 7 ft. 7 in. in height by 70 ft. long, with suitable openings for windows, as compared with the usual construction having a plain girder 3 ft. high and 70 ft. long below the window sill.

On the center sills, which are composed of 12-in., 25-lb. channels, is a top cover plate, and the two sills, including bottom flange angles, provide a total area of 27.9 sq. in. The center sills are supported and aligned by the side frame through the body end sills, the bolsters and a number of cross-bearers, which occur at every main pier, or at 5-ft. 11-in. intervals. This, in effect, produces a compression member stiffened by flanges that are 7 ft. in depth and eliminates all possibility of deflection of the center sills in a vertical plane. As a means for bracing against horizontal deflection there are incorporated twelve diagonal braces which extend from center sills to main piers at the cross-bearers. These diagonal braces, with the side sills and cross-bearers, form a horizontal truss brace for the center sills, 9 ft. 9½ in. wide.

Double body bolsters are provided, the upper member consisting of a plate ¼ in. thick. Forward of this cover plate is a floor plate extending to the front edge of the body end sill. This floor plate securely ties together the side sills, end sills and center sills, co-operating with the diagonal braces in preventing any possible horizontal deflection of the underframe.

The roof of the car has been made to co-ordinate with the upper portion of the side walls in such a manner as to act effectively in combination with the previously mentioned anti-telescoping tie member. This resists compression stresses and protects the passenger space in case of overturning of the car through derailment.

MISCELLANEOUS DATA

The seating arrangement of these cars conforms to that of the other Erie cars now in through-line service, in that they are fitted with a smoking compartment which seats twelve passengers in the middle of the car. The walls of the compartment are fitted with leaded glass windows. Seats in the smoking compartment are upholstered in leather, and those in the end compartments are finished in Erie standard plush. The seating capacity of the car is seventy-six, including the twelve seats in the smoking compartment. Each end of the car is fitted with a saloon and lavatory.

Illumination of the car is obtained by ten incandescent lamps set on the center line of the ceiling. The power for lighting comes from an 800-amp.-hr. Wilson storage battery with lead-lined cells. The capacity of this outfit is sufficient to furnish light for the run from Jersey City to Chicago and return without recharging.

The general dimensions of these cars, which were built by the Pressed Steel Car Company, are as shown in the following table:

Length over vestibule end sills	78 ft. 0 in.
Length over vestibule body end sills	70 ft. 0 in.
Wheelbase of trucks	8 ft. 0 in.
Height of car over all	14 ft. 3 in.
Weight of car body	80,660 lb.
Weight of two trucks, including clasp brakes	30,240 lb.
Weight of car without storage batteries	110,900 lb.
Storage batteries, boxes and hangers	8,700 lb.

The general features of the equipment were selected by F. D. Underwood, president Erie Railroad, and the cars were designed under the direct supervision of William Schlafge, general mechanical superintendent of the system, by the firm of L. B. Stillwell, consulting engineers.

Six-Cent Fare Asked in New York State

Twenty-eight Street Railways Outside of New York City File Petitions with Second District Commission for Financial Relief

TWENTY-EIGHT street railways in New York State, outside of the metropolitan district, joined on June 25 and 26 in filing petitions with the Public Service Commission for the Second District asking for an increase in fare from 5 cents to 6 cents. Virtually every city of any size in the State, except New York City and Buffalo, would be affected if the applications for relief should be granted. A conference on the petitions will be held before the commission on July 6.

Similar printed petitions were sent in by these companies: Albany Southern Railroad; Corning & Painted Post Street Railway; Elmira, Corning & Waverly Railway; Elmira Water, Light & Railroad Company; Fishkill Electric Railway; Fonda, Johnstown & Gloversville Railroad; Geneva, Seneca Falls & Auburn Railroad, Inc.; Glen Cove Railroad; Hornell Traction Company; Huntington Railroad; Ithaca Traction Corporation; Kingston Consolidated Railroad; Northport Traction Company; New York & Stamford Railway; Ogdensburg Street Railway; Poughkeepsie City & Wappingers Falls Electric Railway; Waverly, Sayre & Athens Traction Company; Orange County Traction Company; Peekskill Lighting & Railroad Company; Putnam & Westchester Company, and the Hudson River Traction Company.

The petitions of these companies stated that even the increase of 1 cent would be insufficient to yield reasonable compensation; that the increase was arbitrarily adopted because the reports filed with the commission showed without question that it should be granted immediately. The present condition, it was said, is not due to the war, but is the result of a steady tendency, the effect of which must be counteracted or general insolvency, bankruptcy or even dissolution and abandonment, in many cases, must result.

Each petition claimed that after all expenses were deducted from earnings "there will remain so insignificant an amount that if only a mere nominal value be assigned to the property used in the public service, the return will be much less than 8 per cent, which your petitioner believes is the minimum rate of return which will be sufficient to attract the capital required to enable it to comply with its obligations to the public."

Petitions which differed in some respects from the foregoing were received from the Auburn & Syracuse Electric Railroad, Empire United Railways, Inc., Hudson Valley Railway, New York State Railways, Schenectady Railway, United Traction Company and Westchester Street Railroad. In the case of these companies the Public Service Commission was asked not only to grant the 6-cent fare, but to permit the railway proportionately to increase "rates, fares or charges for such other transportation business as may be performed by it," meaning freight and express rates for the most part.

The United Traction Company, Albany, asked not only for a 6-cent fare but also for a 2-cent transfer charge and a double-fare for owl-car service. After presenting detailed revenue and expense statistics in its petition, this company said:

"From Jan. 1 to June 1, 1917, the revenues have increased over the corresponding period of the previous year, but the excess of revenue has been more than offset by the increase in operating expenses. Unless the revenue for 1917 is increased it will be insufficient to pay expenses, making impossible any improvement or extension to the service which is being constantly demanded by the public.

"The decrease in revenues is largely caused by the increased use of automobiles and by auto bus service, and from the fact that there has been no material increase in population. The great increase in operating expenses is caused by the acknowledged increase in the price of labor and materials, assessments for municipal improvements and taxes. There is no immediate prospect of increasing the amount of travel on its lines, or in decreasing the amount of its operating expenses and other disbursements, and relief can come only by way of increased charges for transportation."

In speaking of the petitions, Joseph K. Choate, chairman of the New York Electric Railway Association committee on ways and means to obtain additional revenue, is quoted as saying:

"Of course, the commission will want to consider the case of each particular company, and the individual companies are preparing special facts for detailed presentation to the commission. But there are certain unusual facts underlying the whole industry which apply to one company quite as much as to another. If the companies are to be permitted to maintain a standard of service in accordance with the continual improvements in the art; if they are to be able to extend their service in accordance with the needs of growing communities, it will be absolutely necessary also to deal with the situation as a whole.

"The fundamental fact in the whole situation is that we are not increasing the price of our service. The purchasing power in labor, materials, etc., of the 5 cents paid for the service is so seriously decreased that we are compelled in the interests of our service to attempt an equalization. Even a 6-cent fare under present conditions will not be as valuable to the companies as a 5-cent fare was five years ago."

Cities Favor Six-Cent Fare for Bay State

Tentative Agreement for Trial Period Reached by Company and Municipal Representatives—Commission Approval Expected

A TENTATIVE agreement between the Bay State Street Railway and representatives of Lynn, Fall River and other important municipalities served by it as to a fare increase for a six-months' trial period was reached at a conference with the Massachusetts Public Service Commission in Boston on June 21. As stated in the ELECTRIC RAILWAY JOURNAL of June 2, page 998, the commission recently gave the company permission to reopen its 1916 fare case, this step being taken in view of the company's contention that at least $1,489,000 additional revenue is needed yearly.

The tentative agreement now reached with many of the most important municipalities on the system as to the necessity of at least a trial period for a fare increase is likely to lead the commission to approve the proposed changes in tariffs and to obviate the protracted hearings which were a feature of the case last year. Some of the company's most determined opponents of 1916 are now in favor of granting a measure of relief through temporarily increased fares. Such difference of opinion as has appeared has been based mainly upon the terms of the plan in regard to the sale of tickets.

The plan devised at the conference includes a general increase in the fare unit from 5 cents to 6 cents in all the present 5-cent fare zones of the system. By the 1916 decision of the commission the fare unit in the rural and outer suburban districts was fixed at 6 cents, that in the cities remaining at 5 cents. It is now proposed to make all basic fare units 6 cents, supplementing this charge, however, in the city districts by the sale of tickets in books at the rate of 5 cents per ride, with free transfers as at present. The company desires to sell books of twenty tickets for $1 without any time limit, the tickets to be used interchangeably when accompanied by the cover. The company also desires to charge the full 6-cent fare on Sundays, holidays and on Saturday afternoons after 1 o'clock. Some protests were raised as to the institution of the higher fare at the end of the week, but Chairman McLeod said that the time might easily come when an advance of 1 cent in the cost of a street car ride would be a very small factor in the increased cost of outings under war conditions. In general, transfers would be good only within city limits. For the present school children would be charged 3 cents per ride under the new arrangement.

Third Avenue Hearing Continued

June 28 Session Given Up Mostly to Discussion of Valuation—Staten Island Lines Ask Six-Cent Fare

THE 2-cent transfer charge hearing for the Third Avenue Railway, the first of the New York City companies to have its petition for relief taken up by the Public Service Commission for the First District, was continued on June 28. The chief point discussed was the value of the property.

The company had submitted as evidence the physical valuation made by the commission as of Sept. 1, 1909, in the 1910 capitalization case. This involved a valuation figure of $35,100,000 for reproduction cost less depreciation. The city opposed the use of this figure now, on the ground that it is not applicable to a rate case, where only used and useful property instead of all owned property should be considered. The commission seemed to feel, however, that the 1910 inventory was competent evidence, subject to proof as to the listed property being in public service.

The 1910 valuation was made under the direction of E. G. Connette, president United Gas & Electric Corporation, who was at that time transportation engineer for the commission. Testifying in the present case, Mr. Connette said that, if all the property listed in 1910 except real estate is in existence to-day, the present cost of reproduction new (with prices averaged over 1914, 1915 and 1916) will be considerably more than that on Sept. 1, 1909. He was not allowed to state whether in his opinion appreciation since 1909 has been sufficient to offset depreciation.

It was brought out by commission counsel that in the later Manhattan transfer case, Mr. Connette determined the non-operating and non-useful property as of July 31, 1911, to be $7,222,758, and that Mr. Floy, the company's expert, fixed the figure at $6,083,212. The hearing is to be continued on July 9.

The Staten Island & Midland Railway and the Richmond Light & Railroad Company, which control the surface lines on Staten Island, have asked the commission for permission to charge a straight 6-cent fare. It is said that relief must be granted to allow the companies to operate at a profit.

Schedule Boards for Patrons

Displaying of Schedules at Street Intersections Has Proved a Success in Athens, Ga.

BY ROSS L. BAKER

Electrical Engineer H. L. Doherty & Company, New York, N. Y.

ALTHOUGH the application of new business principles to the gas and electric business is causing these branches of public utility operation to grow beyond all bounds, the application of those principles to the railway business has been sadly neglected.

A radical departure has been made by the Athens Railway & Electric Company, Athens, Ga., a subsidiary of the Cities Service Company, in the adoption of a schedule board for location at each street intersection along the company's lines. Examples are shown in the accompanying illustration. These boards, so colored as to attract attention, are attached to the electric railway poles. They should be attached so as to overhang the street, and lettered on both sides so as to be visible from both sidewalks, and, if possible, one block off. The lettering on the boards simply states at the top, "Cars Stop Here," and underneath, "Car Due Northbound," at certain "minutes after the hour." The last

EXAMPLES OF SCHEDULE BOARDS SUCCESSFULLY USED IN ATHENS, GA.

phrase is at the bottom of the board. In a parallel column with a "Northbound" column is a "Southbound" column with a minute schedule after the hour.

The Athens boards are experimentally made of wood. They should, by preference, be made wholesale of brightly colored enameled metal, the only painting by hand being the figures for the minute for any given block on the schedule.

These boards have been so successful that no one in the Athens company, from the manager to the motorman, would dream of abandoning them. The advertising value has been very high, and the boards have been very favorably commented on by strangers.

These schedule boards take into account, in a high degree, the psychology of the patron. He comes out of the house in the morning desiring to take a car to town, but there is none in sight. Ordinarily he would stand and wonder whether a car had just left, and how long he would have to wait for the next one. The schedule board sets his doubt at rest, and discourages his usual habit of starting to walk to town and continuing to walk after once started. Becoming familiar with the schedule board through seeing it daily, the patron will soon leave his house just in time to meet the car when due.

The schedule board is particularly needed on a car line having an irregular schedule and one hard for the patron to remember. It is a troublesome process for many men and women to add even easy numbers to twenty-two minutes or forty-three minutes, for instance, after the hour any time during the day and arrive at the time when a car is due. They will not make the effort. Moreover, if the patron desires to take a car from some other corner than the one with which he is most familiar, he is utterly at sea as to when the car is due, or, if he stands along an unaccustomed route, as to how often the car is run. The same feeling is experienced by everyone when standing on the corner in a strange city wondering where the cars go and when.

The schedule board is recommended for any street car line having a headway of ten minutes or longer. It may be located every other block, if the blocks are short. It serves as a motorman's running schedule, and makes a schedule clock for the motorman unnecessary. An accurate watch, however, should be located in a padded compartment, where it will be constantly before his eyes.

An objection which was at first offered to the use of the schedule board is that the rush-hour traffic morning and evening makes it impossible to keep a schedule during those hours. If such is the case, this comes to be well understood, and does not affect the usefulness of the board during about sixteen hours out of eighteen. Another objection has been the possible delay in schedule caused by the holding up of cars at railway crossings. If this is a frequent occurrence, the schedule board can qualify its figures by calling attention to this fact in small print at the bottom.

An interesting development of a schedule-board system would be large illuminated signs overhanging the business district, telling what car line to take to get to interesting parts of the city, such as baseball parks, theaters, depots, colleges, etc., or a large illuminated city map with the car routes shown in colors and interesting points of the city prominently featured.

Employees' Club in Portland, Ore.

The employees of the Portland Railway, Light & Power Company, Portland, Ore., have formed a social club under the name of Employees' Social Club of the Portland Railway, Light & Power Company. The purpose of this club is to handle all social activities of the company. The officers elected for the ensuing year are: B. F. Boynton, who is claim agent of the company, president; C. E. Wagner of the light and power department, first vice-president; Mrs. J. A. Mickelson of the Piedmont division, second vice-president; Stacey Hamilton of the commercial department, temporary secretary. The executive committee consists of Mrs. F. E. Amos, Mrs. W. M. Smith, C. F. Gabler, R. Walker, O. Glenn, H. N. Hall, R. W. Simeral, M. Gay, Miss Rhea Joslyn, R. R. Robley and M. B. Grenfell. It is the announced purpose of the organization "to give the employees and their families a royal good time during the year."

It is significant that the electric utility companies under the management of H. M. Byllesby & Company serve twenty-two municipalities which have, in the past, operated their own generating stations. In every case the municipality has found power purchased from a central station to be more economical than if generated in a city-owned plant, more reliable and efficient, or both.

COMMUNICATION

Illinois Passenger Rates Established by Legislature

East St. Louis & Suburban Railway Company
East St. Louis, Ill., June 19, 1917.

To the Editors:

In a news note in your issue of June 16, you refer to the rate dispute between the steam railroads and the State of Illinois, and say: "The State bases its right to injunction upon the decree of the Illinois Public Service Commission, which permits only a 2-cent rate." The law creating the State Public Utilities Commission of Illinois specifically provides that the commission shall not allow a charge greater than 2 cents per mile. The commission has not, I understand, on its own account made any ruling prohibiting railroads from charging more than 2 cents per mile, but has simply declined to permit a greater charge than this for the reason that the law creating the commission specifically prohibits it from doing so.

I thought you might be under the impression that our commission had made some investigation tending to show that 2 cents per mile is sufficient. As a matter of fact, there has been no occasion for such investigation for the reason just stated.

T. W. Gregory, Assistant Treasurer.

AMERICAN ASSOCIATION NEWS

2462 Subscriptions to Liberty Loan on Chicago "L"

At the meeting of the Chicago Elevated Railroad company section held on June 19 announcement was made that employees had subscribed to $175,500 in 2462 subscriptions. Britton I. Budd, president of the company, addressed the meeting, among other things expressing his appreciation at the outcome of the Liberty Bond campaign. He discussed particularly the subject of team work, its value both to the individual and to the organization, and showed how the ability to get along amicably with his fellow-workers is one of the most valuable assets that man can possess. He demonstrated also that the workers who are keeping the country's industries alive are contributing to the welfare of the country even if they cannot go to the front. Mr. Budd's address was followed with music and amusing recitations. Lieut. M. W. Bridges, former secretary of the section, also spoke with reference to the army. The meeting was attended by 150 members and guests.

Concrete Discussed at Milwaukee Meeting

The speaker at the regular meeting of the Milwaukee Electric Railway & Light Company section, held on June 14, was E. A. Dolan, district engineer Portland Cement Association. The topic was "Concrete and Its Uses." In his address, Mr. Dolan took up the history of concrete, citing a number of cases in which concrete had been used in crude form several thousand years ago. He showed pictures of the first cement mills in this country and also of up-to-date mills, illustrating the stages through which the material must pass from its crude state to the finished product. He also showed a number of colored slides illustrating the different uses that can be made of concrete. In the discussion following the talk, Mr. Dolan answered a number of questions relating particularly to concrete paving and track foundation. A buffet lunch and smoker followed the formal meeting, which was attended by fifty members.

Interesting Westchester Men in Safety

Distribution of a Safety Pamphlet and a Prize Contest for Ideas Have Been of Benefit

With the idea of establishing practical interest in the safety-first movement among the employees of the New York, Westchester & Boston Railway, the company recently distributed among them a pamphlet entitled "The World's Greatest Battle," together with an invitation to submit a short written statement covering (1) that picture in the pamphlet which best illustrated the type of accident most liable to happen in the employee's department; (2) the avoidance of such accidents, and (3) suggested changes or improvements on the company's property tending to decrease accidents in general. A prize of $5 was awarded to the employee in each class of service who submitted the best answers. These classes were made up of office clerks, trainmen, station forces, shopmen, track and building men, linemen, maintainers and telephone men, dispatchers and towermen. The committee on awards consisted of the operating officials of the company, headed by P. W. J. Smith, superintendent, who acted as chairman.

The pamphlet in question, which was published by R. J. Bodmer, Washington, D. C., was particularly notable for the extremely realistic and extremely horrible reproductions of the results of accidents, the author stating that it was written from the workingman's angle —not as a reading proposition, but as a matter of mental impression. According to Mr. Smith's statement practically all of the employees got the impression.

Among the prize winners interest appeared to center on subjects of trespassers, attention when operating switchboards, the maintenance of ladders and the risk of getting clothing caught in machinery. The latter brought about a very definite suggestion on the part of the prize winner in the shop forces, to the effect that counterbalanced belt shifters should be used on all belt-driven machines and that a control for the motor of each motor-driven machine should be close to the operator at all times. Other definite improvements were suggested in connection with the operation of trains at points where pickups of cars are made, these being brought up by the prize-winning trainman, together with comments on other phases of operation wherein a tendency toward carelessness had been growing up on the property.

Forestation Venture by I. T. S.

The Illinois Traction System, Peoria, Ill., has to date planted 30,100 catalpa trees along the company's right-of-way. It is proposed to continue this forestation from year to year with the idea of securing a portion of the ties and fence posts used by the company from its own groves. At the present time these catalpa groves are located at points south of Lincoln and Benld, east of Oakley, west of Cerro Gordo and north of Springfield. The trees are set out on extra right-of-way where they will not interfere with train operation. They vary in height from 18 in. to 24 in. With average growth they should be available for fence post use in about eight years and should be large enough for ties in about ten years. Brief mention of the plan of the company to carry out this work was made in the Electric Railway Journal of April 28, page 796.

Equipment and Maintenance Section

Railway Men Should Get the Benefit of the Other Man's Ideas and Give Him the Benefit of Theirs by Reading This Section and Contributing to It

One-Man Safety Car Made from Old Box Car for $700

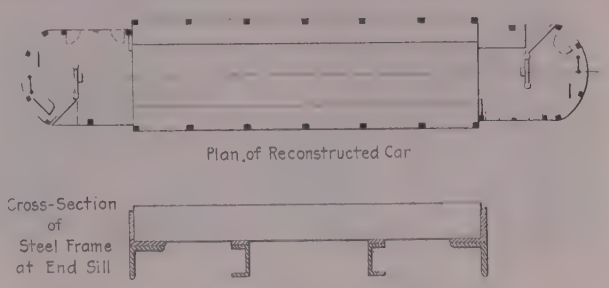
Old Body Was Set in Steel Underframe, Platforms Were Lengthened and Car Was Rehabilitated Generally

BY H. E. WEYMAN
Master Mechanic Levis County Railway, Levis, Province Quebec, Canada.

The Levis County Railway has recently put into very successful operation its first two remodeled "safety" one-man, double-end cars, and its experience with the rejuvenated cars has been so satisfactory that others will be added later. The company had on hand some concave-side, box-type, single-truck cars, about fifteen years old, which were considered good enough to form the basis for modernized cars. They had, of course, small vestibules, bulkheads, etc., as was customary when they were built. The appearance of the old cars is shown in the reproduction of a photograph of one of them, and another photograph shows the present appearance of the two remodeled cars. The principal features of reconstruction were the steel underframes and the lengthening of the vestibules, although all of the details were brought strictly up to date. The work was done under the direction of the writer with the hearty co-operation of A. K. MacCarthy, general manager of the company. The cost for labor and material was approximately $700 per car.

The first operation was the building of the steel underframes, the members of which were as follows: Side sills of 4-in. x 4-in. x ⅜-in. angles, end sills of 3-in. x 5-in. x ⅜-in. angles; cross beams of 7-in., 17¼-lb. channels; outside knees of 4-in. x 4-in. x ½-in. angles; inside knees of 4-in., 7½-lb. channels; bumper beams of 3-in. x 5-in. x ⅜-in. angles. Scraper beams were also attached to the platform knees. The underframe was assembled and riveted together ready for sliding under the box body. It was designed so that the body could be dropped into it without removing anything but the vestibule knees. In other words, the plan was to inclose the old wooden underframe in the steel one, the two to be connected firmly together with angle plates and bolts. After the new underframe was in position the vestibule and body posts were connected to the steel frame by angles riveted at the frame, and when necessary the side posts were connected to the steel frame by angles. Before the new underframe was placed the old vestibule knees and cross beams, which were much the worse for wear, were removed. After the underframe was placed the old vestibules were cut at the body and moved out 15 in., and new pieces of roof were built in. The vestibule bulkheads were cut out, and arches of angle iron, continuous from sill to sill, were inserted to support the ends of the body.

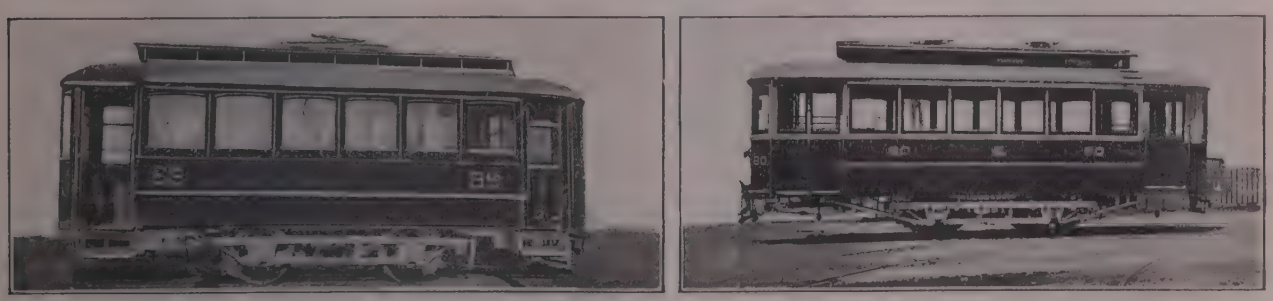
On the right-hand side of each vestibule folding doors replaced the old-style hand doors, and folding steps operating automatically with the doors were installed in place of the old stationary steps. The handles for operating doors and steps were placed near the controllers.



GENERAL PLAN AND CROSS-SECTION OF NEW UNDERFRAME OF LEVIS COUNTY RAILWAY REMODELED CAR

The interior of the car was improved by substituting longitudinal seat frames built up of angle-iron for the old wood-inclosed frames, with reduction in fire risk. The new arrangement is also more sanitary, as it is easier to keep the floor clean. On the side of the vestibule opposite to the door a seat for two persons was built in, and on the door side a folding seat was placed, permitting full utilization of the vestibule when the door is not in use. All of the seats were covered with rattan.

With a desire to have a perfectly sanitary car, all of the old grooved and cut moldings were removed and replaced with plain ones. Incidentally this greatly improved the appearance. Rico sanitary strap hangers, push buttons and buzzers, Consolidated car heaters and Atchley staffless brakes were among the devices which we added to make the car as worthy of the name "safety" car as possible. Railings were erected on the platforms to separate the operator from the passengers and also



LEVIS COUNTY RAILWAY CAR BEFORE AND AFTER REMODELING

to serve as a support for the fare boxes. Two vertical railing posts were carried clear to the ceiling to serve as guides for the curtains provided to protect the operator from the light behind him. The new arrangement of lamps consists of seven single ones down the center of the car, one in each vestibule, and Golden Glow headlights, one operating at a time. Safety car lighting fixtures were used throughout. All of the wiring was inclosed in flexible or pipe conduits. Finally the car was given an attractive interior finish in mahogany, with cream-enameled ceiling and railings.

The remodeled cars are in operation along the south shore of the St. Lawrence River opposite Quebec. They connect with the Quebec ferry service, which is on a

INTERIOR VIEW OF REMODELED LEVIS COUNTY RAILWAY CAR

fifteen-minute headway during the summer and a thirty-minute headway during the winter. There is considerable congestion at rush hours, but the cars have handled the business nicely. The company has a total of 14 miles of track, 8 miles of which run west along the river to the now world-famous Quebec bridge. The track is all single and there are grades up to 12 per cent. Unfortunately there are a number of stub-end lines necessitating double-end operation and this required the use of double-end cars.

Two-Car Train Unit Being Tried Out in New York City

Two-car train operation is being tried out by the Third Avenue Railway of New York City. The experimental unit is made up of two of the company's 43-ft. pay-as-you-enter motor cars, each having a seating capacity of forty-five. The rear door of the front car and the front door of the rear car are used for loading and unloading. The front door of the front car is also used for unloading, but the rear door of the rear car is not used. The three doors are interlocked with the control so that the cars cannot be started until the doors are all closed. The unit is in charge of one motorman and two conductors.

The control equipment consists of a master controller which operates two Westinghouse PK control heads which are applied to the regular type K controllers with which the cars were already equipped. Power for the master controller circuit is furnished by an 18-volt storage battery.

When Does It Pay to Splice Up Scrap Feed Wire?

A Little Algebra Practically Applied Furnishes the Answer—The Author Gives His Experiences on the United Railroads of San Francisco

BY S. L. FOSTER
Chief Electrician United Railroads of San Francisco

In these days of high cost of copper feeder cable its efficient use becomes more important than ever. Hence, in splicing up short pieces of feeder cable, or in fact any copper wire, the question often arises as to how short a length of conductor it pays to splice up rather than to throw it into the scrap. The matter is usually decided arbitrarily by an "educated guess," but it can easily be calculated exactly, as the length in feet of the shortest piece of conductor that can economically be spliced up equals the quotient obtained by dividing the cost of making one splice by the loss per foot sustained in selling weatherproof cable for scrap copper.

The proof of this statement is as follows:

Let a = pounds per foot of new insulated conductor.
b = pounds per foot of same conductor without insulation.
c = cents per pound paid for new insulated conductor.
d = scrap value in cents per pound of bared conductor.
e = number of feet in shortest piece worth splicing.
f = cost in cents of one completed splice.

Then ac = cost of insulated conductor per foot in cents.
bd = selling price of bared conductor per foot in cents.
$bd \div ac$ = portion of a foot of insulated conductor purchasable from proceeds of sale of 1 ft. of bare conductor.
$1 - (bd \div ac)$ = lacking portion of the foot yet to be bought.
$ac[1 - (bd \div ac)] = ac - bd$ = cost in cents of this lack per foot or cents lost per foot on cable sold as scrap.
When $(ac - bd)e = f$, the loss in scrapping the wire will equal the cost of one splice.
or $e = f \div (ac - bd)$.

For example, if a wrapped cable type splice in a 500,000-circ. mil feeder costs $2.21, this same conductor with double-braid weatherproof insulation on it costs 26.5 cents per foot new, and the bare copper sells as scrap for 17 cents per foot. Then $e = 221 \div (26.5 - 17) = 23.3$ ft., the shortest piece that it would pay to splice up.

If the splice had been made with a brass connector and cost only $1 it would have been economical to splice up a piece of cable only 10 ft. long.

All of the items in this simple calculation deserve careful consideration. The difference between the cost of new insulated cable and the scrap value of the copper in old cable is fairly constant in peace times, both in cash and in percentage of cost new, but while percentage remains nearly constant there is a wide difference between peace and war-time cash differences between these two items.

In 1904 double-braid weatherproof 500,000-circ. mil cable cost 15 cents per pound or about 26.5 cents per foot, whereas the bared scrap brought 11 cents per pound or about 17 cents per foot. Here the difference

was 9.5 cents. To-day with new weatherproof at 41 cents per pound and scrap at 28 cents this difference amounts to about 29 cents per foot.

This comparison shows how much more extravagant it is for electrical men to be careless in the use of copper conductor when the price is high than when it is low. In 1917 the difference between the new and scrap prices per foot (29 cents) was 40 per cent of the cost of the new cable; in 1904 the difference was 36 per cent.

The cost of a splice in 500,000-circ. mil cable depends on how and by what priced men it is made. In San Francisco a 500,000-circ. mil splice is made with a one-piece brass sleeve connector, costing 52 cents in 1917, without shortening of the cable and with a minimum of labor, solder and tape. It is almost always made on the ground and can be handled by ground men just as well as by high-priced linemen. In Eastern practice the wrapped-cable type splice usually made, and which is always made by linemen, involves a shortening of the cable by 2 ft. (1 ft. at the end of one cable bared, unlaid, scraped and matched into the similarly prepared wires of a foot of the other cable end). Then about twice as much solder and twelve times as much money for labor are required. On actual competitive tests in San Francisco the Eastern wrapped cable splice in 500,000-circ. mil cable cost 12.4 times as much for labor as the San Francisco sleeve splice. The finished wrapped splice cost $2.21 and the one-piece brass splice 94.5 cents, considering labor and material, in 1904. In 1917 the costs in San Francisco would be $3.47 and $1.01 respectively on account of the rise in cost of copper and solder.

From these figures it is seen by applying the formula derived earlier that the least length of 500,000-circ. mil cable that it would pay to splice up in 1904 would have been 23.4 ft. by the wrapped cable-type splice, and 10 ft. by the San Francisco connector splice. In 1917 the least length by the former would be 11.94 and by the latter 3.4 ft.

If shorter pieces than the above are spliced up, the cost of splicing will amount to more than it would cost to scrap the pieces of cable and buy new wire equal to the total length of the pieces.

$387 Saved by One Application of Formula

An application of this formula arose recently when copper thieves took down 1900 ft. of 500,000-circ. mil cable on an outlying line after the cars had stopped running. On the following night company detectives, prowling around the vicinity, surprised the thieves digging the stolen conductor out of the sand. They had cut it into 162 short pieces varying from 4 ft. to 20 ft. in length.

There were three ways of replacing that 1900-ft. gap in the feeder line. These 162 short pieces could have been sold as scrap and 1900 ft. of new double-braid weatherproof cable bought, the pieces could have been spliced up by the wrapped cable-type splice method and the resultant shortening replaced by new cable, or it could have been spliced up by the San Francisco one-piece connector non-shortening method.

At ruling rates of 41 cents for new cable and 28 cents per pound for scrap copper the first plan would have cost $551.29 net. At $3.47 each per wrapped splice, splicing up the 162 short pieces and one 328-ft. piece of new cable would have cost $568.59. At $1.01 each per San Francisco splice and no shortening of the cable, the splicing would have cost $164.63.

The last method was followed, with a saving of $387 and $404 respectively over the first and second methods, besides a saving in time involved in making the splices and in not having to wait for delivery of new cable called for to replace shortening. If the wrapped cable splice or second method had been used it would have cost $17 more than selling the 162 pieces as scrap and buying new cable, and besides would have left the feeder full of unsightly splices.

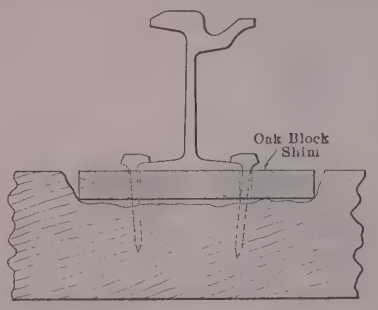
The same logic would apply to 162 short pieces of 500,000-circ. mil cable in the linemen's quarters or the storeroom, or to any number of pieces, or to any other size of conductor. If this splicing of scrap could be done by emergency crews which would otherwise be idle the cost per splice would be less and the minimum economical length of piece worth splicing would be less. Those interested will find this twenty-four-year-old San Francisco splicer fully described and illustrated in the ELECTRIC RAILWAY JOURNAL of Nov. 8, 1915, page 955.

In 1904 the San Francisco order was "Splice up 500,000-circ. mil cable from pieces as short as 10 ft. Scrap all shorter than 10 ft." In 1917 the 10 ft. was changed to 5 ft. as a minimum.

Oak Shims Used in Track Rehabilitation

That worn-out rails on a good foundation can be replaced with second-hand rails with several years' wear left in them, thus avoiding tearing out the ties, is illustrated by a job done on a section of track about a mile in length on the lines of the New York State Railways, Rochester, N. Y.

As the ties were somewhat rotted under the rail but were otherwise in good condition, the bad portion was



CROSS-SECTION SHOWING OAK SHIM

adzed out and an oak block shim was inserted, as shown in the accompanying sketch. The blocks were made 12 in. or 15 in. long by 6 in. wide and of different thicknesses. They were bored so as not to be split by the track spikes. In doing the work it was necessary only to take out the pavement, the foundation being left in place. The paving was readily replaced, but if the ties

CONDITION OF TRACK AND PAVEMENT THREE YEARS AFTER RAILS WERE REPLACED BY AID OF OAK SHIMS

had been torn out the cost of the work would, of course, have been much greater.

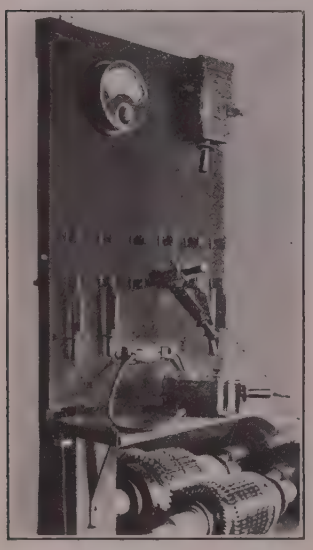
The track was replaced in this manner three years ago, and as may be seen from the accompanying illustration the track and paving are both in good shape.

Home-Made Equipment for Circuit-Breaker Testing

A Neat and Convenient Equipment for Performing a Routine Test with Speed and Precision

BY W. P. LISH
Master Mechanic Fitchburg & Leominster Street Railway, Leominster, Mass.

To facilitate the rapid testing of circuit breakers, the installation shown in the accompanying views was recently made under the writer's direction at the repair shops of this company. In brief, the apparatus consists of a group of six General Electric No. 6 type cast-grid resistors connected with six quick-break knife switches which are mounted on a panelboard of asbestos wood and wired to enable various loads to be placed on the breaker under test. The maximum capacity of the first two switches, counting from left to right, is 200 amp. each, while that of the last four is 300 amp. each. The panelboard is 4 ft. high, 3 ft. wide and 1¼ in. thick; it carries a folding shelf which is 12 in. long, 3 in. wide and 1 in. thick and on which the breaker under test is placed. Flexible No. 2 cable of the type used in motor leads connects the breaker with the supply circuit at the terminals shown in the center of the board. By closing successive switches, corresponding grids may be cut out of the circuit as indicated in the wiring diagram, giving a range of from 150 to 400 amp. The ammeter shown, a General Electric instrument reading to 400 amp., is connected into the supply circuit by the usual shunt arrangement; and a main circuit breaker permanently in service on the panel and normally set at 450 amp. protects the line.

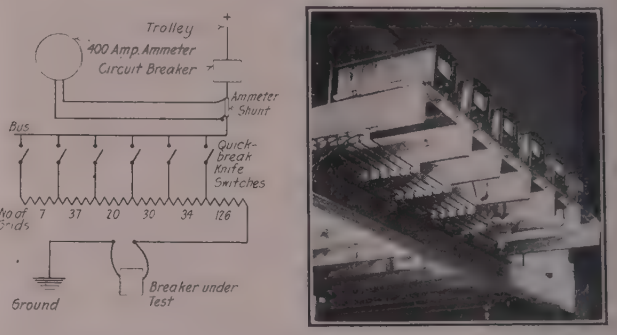


SWITCHBOARD FOR CIRCUIT-BREAKER TEST

It will be seen from the diagram that the final section of resistance always remains in the circuit, so that even if the tested breaker should be short-circuited when voltage is applied to the test wiring, the current will not exceed 400 amp. at 600 volts. The installation is within about 100 yd. of the company's power plant. In the resistance group are a total of 254 grids, the number being indicated in each unit on the drawing. The rheostat rods are much longer than in normal car service, being 31 in. in length by ⅝ in. in diameter, while the bolts are 30 in. long and ½ in. in diameter.

In testing a breaker to be used with four GE-80 or four GE-67 motors, all but the two right-hand switches will be closed. The next to the last switch is then closed, and the current becomes about 350 amp. The breaker should remain closed until the last switch in the group is closed, when the current rises to about 380 amp., depending on the line voltage. The breaker should open under this load. In other words, the breaker for the foregoing motor service should open at a load exceeding that resulting from closing the fifth switch of the group, working from left to right. For use with four Westinghouse 12A motors, a tested breaker should open when the fifth switch is closed, but should remain closed when the fourth switch is closed, the currents being about 350 and 270 amp., respectively. Circuit-breaker adjustments for opening can be made at top speed with this equipment, which, it may be said, contains no new principles, but which represents a very convenient application of well-known wiring arrangements.

One or two other points in the construction of this apparatus may be noted. The panel is supported by four horizontal iron clamps and a brace strap of 2 in. by ⅜ in. fastened to the post carrying the ceiling beams. The resistors are mounted on seven 1¾-in. x 8-in. spruce timbers bedded on a ceiling beam under a small stockroom floor as shown, the timbers being about 6 ft. long and covering a space about 10 ft. wide. Two copper clips are provided on the edges of the panel to hold the test terminals free from the shelf when not in use, the shelf also being held in position by small chains when testing is under way. The resistors are insulated from their supporting timbers, and fiber bushings are applied to the test contacts near their ends to protect the operator. By the use of extra sleeves the terminals can be quickly plugged into either size of breaker used by the company. Arcing under test, which might scar the panel, is prevented by a 2¾-in. x 8-in. x 12-in. asbestos panel shield placed between the test contacts and the breaker. Fuses can also be readily tested with this equipment.



WIRING DIAGRAM FOR CIRCUIT-BREAKER TEST; VIEW OF RESISTORS MOUNTED IN PLACE

Armature Shafts Repaired by Welding on Steel Tubing

The Elmira Water, Light & Railroad Company is using a novel method of repairing worn armature shafts on the commutator end. Steel tubing is purchased which has an outside diameter equal to that of an unworn armature shaft plus a very thin skin cut. The worn shaft is turned down so that the tubing can be put over it with a shrink fit.

To insure a tight fit between the sleeve and the shaft a circular groove is cut in the end of the shaft along the joint between the steel sleeve and the shaft. This groove is then welded full of metal and the shrink fit and the weld give the required strength.

The Union Traction Company of Indiana maintains at Anderson, near the shops, a greenhouse to accommodate the plants and flowers used at the company's park and station grounds. The greenhouse is in charge of the head gardener, and furnishes accommodation for the storage of roots during the winter.

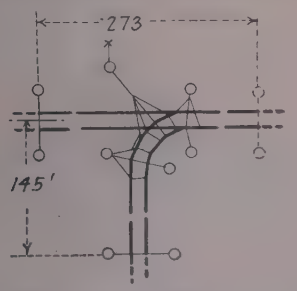
Cost of Erecting Overhead Work—XI

(From the records of a large Eastern company)

The following is the eleventh group of a series of diagrams with figures to show the actual costs of erecting the various types of overhead construction described under conditions of light, ordinary and congested traffic. The preceding groups of this series were published in the issues for Jan. 20, page 127; Jan. 27, page 173; Feb. 10, page 260; Feb. 24, page 355; March 10, page 447; March 31, page 606; April 14, page 702; May 12, page 880; May 26, page 969, and June 16, page 1105. This is the final group of the series of plates showing the costs of erecting overhead work.

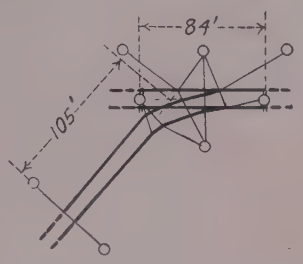
LABOR REQUIRED FOR CONSTRUCTING VARIOUS TYPES OF OVERHEAD TROLLEY SPECIAL WORK UNDER VARIOUS TRAFFIC CONDITIONS

Double track left hand branch-off, angle 90 deg.



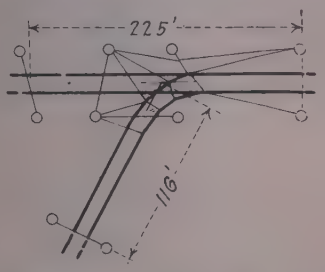
No.	Light Labor	Light Trucking	Ordinary Labor	Ordinary Trucking	Congested Labor	Congested Trucking
77*	$32.67	$23.76	$39.93	$29.04	$47.19	$34.32

Double track left hand branch-off, angle 45 deg.



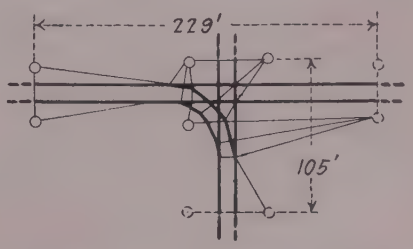
No.	Light Labor	Light Trucking	Ordinary Labor	Ordinary Trucking	Congested Labor	Congested Trucking
78	$23.93	$9.90	$28.71	$11.88	$35.09	$14.52

Double track left hand branch-off, angle 60 deg.



No.	Light Labor	Light Trucking	Ordinary Labor	Ordinary Trucking	Congested Labor	Congested Trucking
79*	$36.30	$26.40	$43.56	$31.68	$50.82	$36.96

Double track crossing double track with double track connecting curve angle 90 deg.



No.	Light Labor	Light Trucking	Ordinary Labor	Ordinary Trucking	Congested Labor	Congested Trucking
80*	$36.30	$26.40	$45.38	$33.00	$54.45	$39.60

*Trucking includes cost of extra reel truck. None of the figures on this page includes cost of superintendence and engineering.

Costs of Installing Special Work to Begin in an Early Issue

M. Bernard, assistant engineer way and structures department Brooklyn (N. Y.) Rapid Transit System, will contribute a series of plates giving the cost of installing different types of special work. The figures have been compiled from a large number of representative jobs, and sufficient details will be given to allow track men to compare these costs with those on their own systems.

Waterproofing Rail Joints with Asphaltum

BY A. L. KALLOCH
Secretary Austin (Tex.) Street Railway

As a means of increasing the life of our track joints we are experimenting with the use of pitch as a means of sealing the joints against water. After the concrete base for the track has been poured, and before the bricks are placed, we dam up around the joints completely, except for one small opening into which hot pitch is poured. This pitch is what is known as grade "D" asphaltum (melting point, 175 deg. Fahr.), purchased from the Magnolia Petroleum Company. It is heated so that it is very thin and when poured will run into every small cavity and completely fill the space between the angle bar and the rail.

This pitch is of such consistency that in cold weather it does not become brittle, and during the excessive heat which we have in this section of the country, even though it becomes hot enough to melt and run, it cannot get out of the joint on account of the grout filler used in placing the brick. The cost per joint for labor and material, averaged over those which we have already put in, is 16 cents.

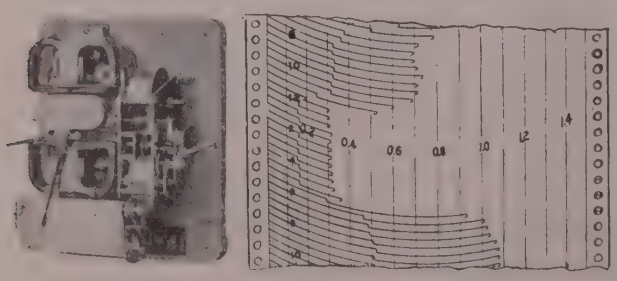
The track on which this experiment is being made is laid with 72-lb., 6-in. T-rail. International steel ties at all joints. Straight six-bolt angle bars and drive-fit bolts are used.

While we are unable at this time to give any data on the real worth of this construction since we have had it in use less than a year, yet we feel that this method will at least be effective in keeping water out of the joints.

Recording-Demand Watt-Hour Meter

In order to avoid having the commercial peak load occur simultaneously with the railway peak on railways selling large amounts of energy, it is often desirable to fix the rates according to the time of occurrence, the duration and the amount of the maximum demand. To determine these factors a meter has been developed which indicates on a four-counter dial the total kilowatt-hours consumed, and records on a paper strip the total energy used over successive predetermined time intervals. The instrument is installed as an ordinary watt-hour meter and requires no additional apparatus or wiring.

Under load the gear train of the watt-hour meter advances the counter in the regular manner. At the same



RECORDING-DEMAND WATT-HOUR METER AND SAMPLE OF RECORD MADE

time the ink-carrying pen is caused to advance across the record paper in proportion to the energy used. At the end of a predetermined time interval a stud on a reset wheel releases the pen gear from mesh with the gear train and a balancing weight returns the pen to zero, where it is again meshed with the gear train to repeat its advance during the next time interval. An operating spring controlled by the clock causes the record paper to advance 1/16 in. every fifteen minutes. Thus if the meter is arranged to record the demand at fifteen-minute intervals, the paper advances just before the pen is reset so that the pen makes a distinct and readily-observed record at the maximum point of its travel. This shows both the amount of the energy used during the interval and, by the time calibrations printed on the record paper, the time of its occurrence.

The meter is the product of the Westinghouse Electric & Manufacturing Company and is known as the type RA recording-demand watt-hour meter.

Maintenance of Rattan Seating

In the shops of the Beaver Valley Traction Company, New Brighton, Pa., it is the practice to repair worn rattan seats by splicing in new strips as shown in the accompanying illustration. In this case the total cost of the job, including the labor and material necessary to splice in a 2-ft. strip of rattan, was $1.84, whereas if the 8-ft. seat had been entirely recovered with rattan at 24 cents a foot it would have cost $6.18. The only

METHOD OF SPLICING RATTAN SEATING, BEAVER VALLEY TRACTION COMPANY

tools required in doing the work are a sack tier needle and a small pair of pliers.

The following formula is used as a mixture for cleaning the seats in the shops:

Aqua ammonia	2 oz.
Soft water	1 qt.
Saltpeter	1 large teaspoonful
Ivory soap, shaved	1 oz.

The soap is thoroughly dissolved in hot water and then the saltpeter and ammonia are mixed in. This is applied with the ordinary scrubbing brush, after which the seats are rinsed off in clear water.

F. R. Fox, master mechanic Toledo & Indiana Railroad, Stryker, Ohio, reports that this spring the company equipped all of its cars with water-cooler and bottle service after a successful experiment on two cars early in the year. One of the corner seats in the front end of the main compartment in each car was removed and a pedestal was constructed to support the cooler and hide the waste pipe. This pipe has a funnel-shaped opening and is located about 5 in. below the faucet. There is also a side chute in the pedestal for receiving used paper drinking cups. A wooden band, equipped with hinge and hasp, and attached to the partition, clamps the bottle a few inches below the top.

News of Electric Railways

Traffic and Transportation

Financial and Corporate | Personal Mention | Construction News

Plans for Rhode Island Investigation

Special Committee Created by Legislature Outlines Subjects Which Will Be Covered by It in Inquiry Into Rhode Island Company Affairs

The special committee created by the Rhode Island Legislature to examine the Rhode Island Company, which operates the electric railways in Providence and vicinity, and grant financial relief if it finds such relief justifiable, made the first formal announcement of its plans on June 23, in a statement signed by Zenas W. Bliss, chairman. The statement follows:

"In accordance with the provisions of Chapter 1516, approved April 19, of the public laws, the special commission for the investigation of the affairs of the Rhode Island Company met and organized on May 1.

"The preliminary investigations of the special commission demonstrated the necessity of a systematic and complete analysis of the physical and financial condition of the Rhode Island Company along the following general lines:

"List of companies; capitalization; physical property; distribution of property by companies and civil divisions; distribution of property by sections and fare zones; estimated cost of reproduction new and present value of all properties of the several companies; cost of operation for last five years; proportion of service to traffic; increases in cost; normal and present abnormal prices of materials, labor, coal, etc.; detailed analysis of operating expenses; taxes and other expenses in nature of taxes; comparison with other cities; analysis of depreciation and renewals; return on capital; average rate of return; analysis of leases; possible economies; estimate of cost of service for present year; traffic survey; average haul in comparison with other cities; proportions of short and long haul; movement of transfer passengers; suitability of service to traffic; allocation of cost of service to several routes.

"Experts employed by and under the direction of the commission are to begin the work along the lines as generally outlined above at once.

"The questions involved appear to the commission to be of such vital importance to the public that information in regard to the matters involved should be made available as promptly as possible. The commission will, therefore, furnish for publication the results of its investigations as soon as material is obtained in sufficient quantity and can be arranged in intelligible form. In addition to furnishing this information as promptly as possible, ample provision will be made for public hearings upon matters within the scope of the authority of the commission."

Strike in Steubenville

Trainmen on the Steubenville, Wellsburg & Weirton Railway, which connects Steubenville, Ohio, with Follansbee and other towns in West Virginia, declared a strike on June 25 to enforce their demands for an increase in wages to 40 cents an hour. The company had offered the men 34 cents an hour. Apparently both sides have settled down for a period of waiting. Up to June 26 the company had made no endeavor to move its cars.

The business men of Steubenville and vicinity, through the Steubenville Chamber of Commerce, have asked the strikers to have their representatives meet with them in an endeavor to ascertain what they really want and what they will accept in settlement of their differences with the company. Mill men and others, who have depended entirely on this road for transportation, are experiencing great difficulty in getting to and from their work.

Southern Pacific Fuel Problems

Fuel Oil Shortage Severe—Electrification Suggested to Relieve Congestion on the Tehachapi Pass

At a hearing before the Railroad Commission of California early in the week ended June 30 W. R. Scott, general manager of the Southern Pacific Railroad, stated the fuel oil shortage was such that unless there was speedy relief train service must be curtailed. Considering all oil storage and sources of relief now apparent, ninety days was the maximum period for which operation on the present basis was possible. At present the company consumed 44,000 barrels of oil a week. Of this amount 18,000 barrels were being purchased in the open market. The converting of divisions to coal consumption had been considered, but the idea was abandoned as unwarranted when the visible supply of coal was taken into account.

Another very serious problem was the freight congestion over the mountain divisions, particularly the Tehachapi Pass where a single-track line must accommodate two transcontinental systems. The congestion was due partially to increased business and partially to absence of bottoms for transcontinental shipments via the canal route. Under these conditions speedy electrification had been suggested. The cost of electrification was believed to be less than double-tracking, which could be postponed by the increased capacity due to electrification. If the railroad could adapt its requirements so as to use standard electrical equipment it was believed that as an emergency measure manufacturers could supply the locomotives and at least the most critical mountain pass could be operated as an electrified division within ten months. If this was found feasible it would at the same time relieve the freight congestion and release the oil now inefficiently used in steam locomotives for purposes where hydroelectric energy is not suitable.

Toledo Mayor Seeks Valuation

Appropriation of $25,000 Asked to Value the Property of the Toledo Railways & Light Company

In presenting his expense budget to the City Council recently Mayor Milroy of Toledo, Ohio, asked for an appropriation of $25,000 to be used in making a valuation of the street railway property of the Toledo Railways & Light Company. He said that the street railway problem would never be solved until the fair value of the property was known. This must be ascertained in case the city decided to buy the property, and was necessary to fix a just and reasonable fare. In continuing, the Mayor said:

"It has long been settled by the courts that a public service corporation may charge only such rates as will permit a reasonable profit, say 6 per cent, the legal rate of interest on the money actually invested. According to the company's own report it made a profit of $510,000 on its street railway last year after paying all expenses and taxes. This amount is 6 per cent on $8,500,000. Will anybody assert that the street railway is worth that much? Yet, here we are paying a rate of fare that would be just only if there was an actual investment of $8,500,000. The company pockets the amount and suggests that it may be compelled to raise the fare again."

The Mayor went on with the statement that the company was able to make such a profit because the true value of the property was not known to the public, and that only by employing its own engineers and experts would the city be able to arrive at such a valuation.

New Wage Scales in Chicago

Surface Lines and Elevated Railways Make New Wage Agreements—Scale Increased Three Cents an Hour—New Contract Period Is Three Years

The Chicago Surface Lines and the Chicago Elevated Railways, through their presidents and after conferences with officials of the Amalgamated Association of Street & Electric Railway Employees, have agreed upon three-year working contracts for the men with a horizontal increase of 3 cents an hour. The agreement between the Surface Lines and the men includes the renewal of all the conditions of the 1915 contract, except the wage scale.

Details of the New Surface Railway Wage Scale

The old and the new scales for the surface railway men follow:

	Old Wage Per Hour	New Wage Per Hour
First three months	27 cents	30 cents
Second three months	29 cents	32 cents
Second six months	30 cents	33 cents
Second year	32 cents	35 cents
Third year	33 cents	36 cents
Fourth year	34 cents	37 cents
After fourth year	36 cents	39 cents

An increase from $3 to $3.25 is provided for night car runs. Car repairers, car placers and cleaners, and other shop and operating employees, members of the union, also receive increases on the 3-cent basis whether paid by the day, week or month. According to Leonard A. Busby, president of the Chicago Surface Lines, the new agreement carries with it a wage increase of about $1,500,000 a year. Mr. Busby has stated that this increase is not warranted by the financial condition of the company, and in fact no increase is warranted at the present time, but on the other hand the management felt that it was its duty to meet the issue of increased cost of living and to go as far as reasonably possible in helping the men. He said the only way in which the company would be able to carry this heavy burden would be through the loyal co-operation of its employees.

On June 26 the union members ratified the Surface Lines contract by a vote of about three to one in favor of the agreement. Some of the younger members of the organization created considerable opposition on the plea that the union would be bound for three years. All previous contracts have been for two years.

Rates of Wages on Chicago Elevated Railways

The men on the Chicago Elevated Railways voted on their contract on June 27. The wage scales, new and old, for the elevated railway employees follow:

	New Rate Per Hour	Old Rate Per Hour
Regular motormen	41 cents	38 cents
Extra motormen:		
First year	35 cents	32 cents
Second year	36 cents	33 cents
Third year	37 cents	34 cents
Fourth year	39 cents	36 cents
Conductors	34 cents	31 cents
Regular guards	31 cents	28 cents
Extra guards:		
First year	28 cents	25 cents
Second year	29 cents	26 cents
Third year	30 cents	27 cents
Fourth year and over	31 cents	28 cents
Switchmen:		
First year	35 cents	32 cents
Second year	37 cents	34 cents
Third year	38 cents	35 cents
Fourth year	40 cents	37 cents
Fifth year and over	41 cents	38 cents

	New Rate Per Month	Old Rate Per Month
Flagmen:		
First year	$53.30	$42.50
Second year	56.80	46.00
Third year and over	62.80	52.00

	New Rate Per Day	Old Rate Per Day
Women ticket agents:		
Regular	$2.35	$2.05
Extra, first year	1.95	1.65
Extra, second year	2.05	1.75
Extra after second year	2.15	1.85

W. D. Mahon, president of the Amalgamated Association, urged the men to accept the agreements. He said that they provided for the largest single increase in wages members of the association had ever received. The men might not profit near so well under arbitration, he pointed out.

Work on St. Louis Compromise

Program Laid Down for Conferences Looking Forward to Settlement of Matters at Issue Between City and United Railways

At a conference in the office of Mayor Kiel of St. Louis, Mo., on June 20, City Counselor Daues and Thomas M. Pierce, special counsel for the United Railways, were instructed by the joint committee to prepare a skeleton plan of compromise with the city within two weeks as a basis for negotiation by the committee. Mayor Kiel presented an outline of the city's program, which is: Full payment of the mill tax to date, $2,135,466; a partnership with the city, in which profits would be divided, scaling down of the United Railways capitalization and recognition of franchise rights for a substantial period in the future.

President McCulloch's Suggestions

Richard McCulloch, president of the United Railways, said that the company was willing to enter into a partnership or any other arrangement suggested, provided the city would make it possible to induce investors to advance money needed for improvements. Mr. McCulloch urged speedy action by the conferees, but Mr. Daues said it would not be possible to submit a report within a week, and the time was extended to two weeks. The city officials were also assured that the company was prepared to let the city in as a "full partner" in the traction business, provided a compromise of franchise and mill tax litigation could be arranged that would enable the company to borrow the money required for extensions and improvements in the next few years.

The committee representing the city is Mayor Kiel, Comptroller Nolte and Aldermen Tamme, Bergt and Schrantz. The committee representing the company is Mr. McCulloch, Murray Carleton, A. L. Shapleigh, A. J. Siegel and Thomas M. Pierce, counsel for the company.

It was reported unofficially that City Counselor Daues and C. E. Smith, consulting engineer of the Department of Public Utilities, had been quick to agree upon the general outlines of the city's counter proposal. These were stated in brief as follows:

City's Counter Proposal

"Valuation of the company's properties and contraction of its present capitalization, with a limitation of earnings to 6 per cent after deductions for depreciation, operating expenses and other charges.

"Provision for sharing the net surplus in the ratio of 60 per cent for the city and 40 per cent for the company.

"Creation of a sinking fund (as one of the fixed charges) for a gradual reduction of the capitalization below the amount to be fixed in the first agreement, so as to afford the city the right and opportunity to purchase the property at a decreasing cost.

"Reservation of the city's option of using its share of the net surplus either for public purposes or for reinvestment in improvements or extensions of the company's present system, or in the building of either subways or elevated lines or both.

"Participation by the city in the management of the company by the election of several—probably four—municipal officials as directors of the company and the appointment of another to act with the president of the corporation and supervise expenditures, including those for wages, salaries and purchases of supplies, and for improvements, betterments and extensions."

This much having been accomplished it was then stated that a meeting of the joint conference representing the company and the city would be called by Mayor Kiel for Tuesday, June 26, if by that time Counselor Daues and Engineer Smith had completed their tentative draft of the city's proposals. The Mayor desired to have the plan submitted to officials of the United Railways before he left for New York on June 27, to be absent for five or six days.

Representatives of the city and officers of the company conferred again on June 26 and after various sections of the so-called "skeleton plan" had been discussed the matter was put over until July 6. This conference resulted in making public the full "skeleton plan."

British Columbia Strike Settled

Settlement Results from an Agreement Between the City and the Company to Arbitrate Problems Before Them

The strike of the employees of the British Columbia Electric Railway, Vancouver, B. C., ended on June 22. The men were granted all demands, including the increase of 5 cents an hour. The settlement resulted from an agreement between the company and the municipal authorities to arbitrate jointly the problems before them under a commission appointed by the provincial government. Both sides are to abide by the findings of this commission. A feature of the agreement was that the company had to resume service at once and continue it. When the employees refused to compromise on the matter of wages the company agreed to their demands. It has not been settled whether the increase in wages is to be permanent or only for the duration of the war. The new wage scale is 27 cents for the first six months; 35 cents for the next eighteen months; 36 cents after two years; 38 cents after three years and 40 cents after four years. The former scale was 27 cents for the first year; 29 cents for second year; 31 cents for the third year; 33 cents for the fourth year and 35 cents for the fifth year. The interurban employees get the same rate of increase.

REVIEW OF STRIKE

The strike on the British Columbia Electric Railway in Vancouver and New Westminster was declared on June 13, after a demand for higher wages had been refused by the company. About 800 men went out. They were joined on June 14 by 300 employees of the same company at Victoria. The men who ceased work included motormen and conductors, car repairers, machinists, blacksmith's helpers, and others who were members of the Amalgamated Association. As a result the street car lines in Vancouver and suburbs, North Vancouver, New Westminster and Victoria ceased operation and the interurban lines owned by the same company, known as the Central Park line and Burnaby Lake line, between Vancouver and New Westminster, and the Saanich line at Victoria, also suspended operations.

WHAT THE MEN DEMANDED

The men were under an agreement dated Sept. 15, 1916, which was to run until June 30, 1918, or at the expiration and six months after the cessation of the war, whichever date came first. The wage scale for city and suburban motormen and conductors, car repairers, armature winders' helpers, blacksmiths' helpers, machinists' helpers and sawyers, as noted previously, was: First year, 27 cents; second year, 29 cents; third year, 31 cents; fourth year, 33 cents; after fourth year, 35 cents. The motormen and conductors on the interurban lines were to receive 1½ cents an hour in addition to these rates. Owing to the increase in the cost of living, the men demanded increases to the following scale: Motormen and conductors on city lines, car repairers, etc., first six months, 27 cents; next eighteen months, 35 cents; third year, 36 cents; fourth year, 38 cents; fifth year, 40 cents. On the interurban lines the same increase of 1½ cents an hour above these rates was demanded. For track men 27 cents an hour was demanded for the first six months, and after that 35 cents an hour. The men, in all departments, requested a minimum wage of 35 cents an hour after six months' service. All men on a monthly salary were to receive an increase of $10 a month.

COMPANY'S COUNTER OFFER

The company's counter offer was of a series of war bonuses. Under its offer men paid up to $60 a month were to receive 15 per cent additional; men paid more than $60, but not more than $70 a month, 10 per cent; more than $70 and not more than $80, 5 per cent. The men voted to strike when the company refused to meet their demands and as a consequence no cars were operated in Vancouver, North Vancouver, New Westminster and on the Central Park and Burnaby Lake lines on June 13.

The company contended that the offer it made of war bonuses was adequate to meet the increase in the cost of living according to figures in the *Labor Gazette*, the dominion government's official publication. Although the cost of living was 18 per cent higher in Winnipeg than in Vancouver, the rate of wages offered the men was said to be higher in Vancouver. The company also pointed out that the men had received increases amounting to $120,000 a year in the fall of 1916 in spite of the existence of an unexpired agreement. The company contended that the proposed war bonuses were sufficient to meet any increase that had taken place since then.

The men said that the increases granted by the company last fall were only sufficient to bring wages to the level of what they should have been before the war and that since then an increase in the cost of living has occurred which warranted the payment of the further increases demanded.

COMPANY'S GRIEVANCE AGAINST CITY

A parallel contention by the company was that owing to jitney competition and the fixed nature of its fare, it was unable to operate under present conditions and grant the wage increases demanded by the men. On the Vancouver city system the fare is 4 1/6 cents with transfer privileges, while in North Vancouver and New Westminster, which are separate systems, there is a straight 5-cent fare.

Since December, 1914, the company's revenue has been seriously depleted by jitney competition, which has been more or less unregulated by the city. Jitney by-laws have been passed by the city of Vancouver, but the enforcement of them has been lax and when the strike occurred about 150 jitneys were operating in competition with the paying city lines, the non-paying business to the suburbs being left entirely to the street railway. In addition to the decrease in revenue caused by the jitney the company suffered through the increase in the cost of operation. It had also been affected by the increase in taxation both under the provincial government and under the local governments of the districts and cities in which it operates. The company has $48,000,000 invested in British Columbia and the increase in taxation to provincial and local governments was expected to be $50,000 this year.

INTERURBAN SERVICE STOPPED

Passenger service on the Lulu Island interurban lines of the company was stopped on June 17 when, in accordance with the request of the Electrical Workers' Union, the company was compelled to cease the employment of the three foremen on the maintenance of its rolling stock used on these lines. The electrical workers contended that this was a breach of the arrangement under which they promised not to take part in the strike and rather than jeopardize the light and power service on the mainland, the company decided to cease the employment of these foremen on maintenance work. In the interest of safety the operation of all cars on these lines was suspended. On June 18 the Fraser Valley division was being operated, but with only one car to a train instead of three.

The company set its case frankly before the public in paid daily newspaper advertisements.

Frontier Case Closed

Testimony on the application of the New York Central Railroad and the Erie Railroad for the revocation of the certificate of the Frontier Electric Railway was concluded before the Public Service Commission at Albany. Chairman Van Santvoord stated before the hearing closed that only in its last stages had the commission been frankly informed of the plans of the Pennsylvania Railroad and the Delaware, Lackawanna & Western Railroad with regard to the Frontier line. It was brought out at the hearing on June 18 that the contract for the purchase of the road's stock by the two trunk lines was to some extent contingent upon the approval of the commission for the construction of the proposed line at grade.

The testimony was concluded by statements from railroad operating officials aimed to show that even should the line be built it would grant no great relief to the Pennsylvania and the Delaware, Lackawanna & Western from the congested conditions of connections with Canada at Black Rock from which they say they now suffer.

The companies have two weeks in which to file and answer briefs.

Meaning of Loss of Chicago Bills

Legislature Failed to Sense Popular Demand for Measures Based on Report of Chicago Traction and Subway Commission

The four Chicago traction bills have failed of passage in the Legislature. As stated in the Electric Railway Journal for June 23, these bills were intended to supply the enabling legislation for Chicago's extensive traction plan. The measures had passed the Senate with generous majorities and were reported to the House committee on public utilities and went to the third reading. The committee then adjourned without a record vote on any of the bills.

The bills before the Legislature grew out of the presentation of the report of the Chicago Traction & Subway Commission early in December, 1916. While considerable delay was brought about in the consideration of these bills by the Council, they were finally drafted and embodied the principal legislation needed to put through the program of the commission. The so-called "home-rule" bill was modeled after the State utilities act and would have transferred to the City Council the control over service and rates now held by the utilities commission. An editorial on the loss of the home rule bill appears elsewhere in this issue.

There was also a bill providing for the merger of the elevated and surface lines in Chicago. The Traction & Subway Commission report recommended the adoption of an indeterminate franchise, but this was attacked principally on the ground that it was virtually a perpetual franchise. The commissioners and the railway officials thought the fifty-year franchise was necessary in order to carry out the construction program. Finally, on May 9, a straight thirty-year franchise bill was approved by the Council and sent to the State Legislature. The fourth bill was designed to remove the doubt expressed by counsel as to the right of the city to construct and own subways. This measure was also approved by the City Council on May 9.

What the Loss of the Bills Means

All the bills recommended to the Legislature in connection with the traction program contemplated that no ordinance in connection with them should go into effect until after a referendum vote at some regular or special election. The complete loss of the legislative program for Chicago in the Legislature provoked a great deal of discussion. An expression of opinion on the loss of the bills by a man interested in the measures follows:

"The death of the four bills is most disappointing to the people of Chicago, the Chicago local transportation committee and to part of the traction interests at least. Just what the attitude of the other traction interests was is not definitely known, except that such evidence as was manifest indicated opposition. The Assembly seemed less concerned with the Chicago bills than with any other matters before it and did not quite grasp the idea of the city instead of the traction companies asking for something. It was disinclined to study the bills which Walter L. Fisher and Henry D. Capitain presented purely on their merit, and preferred instead to assume that something was being put over and to refrain from giving any thought or attention to them.

"Practically no discussion of the bills themselves was heard. Those of the opposition who talked simply orated on the awful ordinances that were going to be passed in Chicago on the strength of these bills. Other influence against the bills was plainly in evidence, but its nature could not be deciphered by the Chicago representatives. The Senate had previously considered the bills carefully, and was satisfied that there was little substance in the arguments which the opponents of the measures summoned to their aid. It passed the bills by decisive majorities.

"The issue is now dead, at least as far as any comprehensive plan is concerned, for two years, when the Legislature meets in its next regular session. The companies might still come to some temporary operating agreement looking toward an improvement in conditions, but this is quite improbable, and not much could be gained. The complete plan of the Chicago Traction & Subway Commission was needed, and the failure of the State Assembly to put through the program may be placed to its discredit as an instance of gross evasion of a popular need."

Bonus Payment at Athens

Unusual Conditions Prompt Athens Railway & Electric Company to Start Bonus System—Problems Before the Company Reviewed

On June 2 the Athens Railway & Electric Company, Athens, Ga., handed to each of its employees a bonus check, the first of a series which will supplement the last pay check each month until further notice. The bonus check amounts to about 10 per cent of the monthly payroll. To each employee was also handed at the time of the payment of the wages on June 2 a letter from C. D. Flanigen, president and general manager of the company, setting forth the reasons for the payment and reviewing the conditions that confront the company. Among the exacting requirements which it is called upon to meet are paving charges, demands for free service, accidents not due to carelessness on the part of the company and other obligations that are based largely upon public opinion rather than justice. All these pile up the cost to the company. More recently there has come along the unprecedented increase in the cost to the company of practically all material consumed by it in its regular operations. Mr. Flanigen concluded his letter as follows:

Letter from the President to His Employees

"Unable to ask the public more than 5 cents for a ride, or more than the old scale for electric light and power until they realize in the light of the present-day conditions the inequity of some of the burdens upon us, it has seemed out of the question to increase our payroll, but we realize that for you the situation has become so acute that some relief is necessary and we have determined in the uncertainties of the present and the absolute blank as to the future to issue to each man at the end of each month, for the present at least, a bonus check to supplement his regular pay, and so help him to meet the increased demands made upon him.

"Your bonus, if you have made a full month, will be $..... with a proportionate amount for part time, and we trust this addition to your pay check will enable you to meet all your obligations, and that we may be able to continue it so long as it is needed.

"As manager of the company and your fellow co-worker, I wish to avail myself of this opportunity to express to you my appreciation of your co-operation in enabling us to sell a first-class brand of service. Service is our merchandise and we should not be satisfied with anything less than the best for our customers. We have been pulling together and the New York office appreciates the results we have got in face of the adverse and unusual conditions that have hampered us. Our success in inaugurating economies undreamed of before without detriment to the service shows that nothing is impossible where there is efficient team work and earnest co-operation, and for this I wish to thank you."

Employees Express Their Appreciation

On June 4 Mr. Flanigen received the following letter of appreciation from a committee of the employees:

"We, the undersigned, employees of the Athens Railway & Electric Company, take this method of thanking you for the raise, or 'bonus' attached to our salary check of June 1. We assure you that it was appreciated by all. In return we wish to pledge our efforts and co-operation in maintaining the good record made by this organization. We also wish to pledge to the company, and the public it serves, the very best service our ability affords. We thank you."

Springfield Strike Settled

The strike of the employees of the Springfield (Mo.) Traction Company has been terminated by mutual agreement on an open shop basis, the men have returned to work and good feeling and harmony prevail. An agreement has been entered into whereby in case of dispute and failure to agree between the company and the employees, the matter is to be referred to a board of arbitration. This board is to be composed of one member representing the company, one representing the employees and a third member selected from the Public Service Commission of Missouri. The strike has been in progress since October, 1916.

Massachusetts Special Commission

Members of the Body That Will Inquire Into Massachusetts Street Railways Named

W. Cameron Forbes, former Governor General of the Philippines, and former State Senator Gurdon W. Gordon of Springfield, have been appointed by Governor McCall of Massachusetts to be members of the special commission to study the problems of the street railways of the State. The other members of the commission were appointed from the Senate and the House of Representatives by Speaker Cox and President Wells. They are Senators Martin, North Attleboro; Eldridge, Somerville, and Harrop, Worcester, and Representatives Gibbs, Waltham; Worrall, Attleboro; Bunting, Methuen; Hays, Boston; Donovan, Boston, and Fitzgerald, Northampton. Senator Gordon was a former chairman of the legislative committee on street railways.

Violence in Dayton Strike

Although conductors and motormen of the Dayton (Ohio) Street Railway stated that there would be no violence during the strike, disorder has resulted. The company has kept its cars moving fairly well with men of the city employed by the company when its own men stopped work.

On June 25 three cars were attacked by a crowd and all the windows which had not been lowered because of the warm weather were broken. None of the passengers riding on the cars was injured.

A squad of police called to the scene undertook to guard one of the cars until it was run out of the vicinity, but the mob forced itself between the car and the automobile containing the officers and while in sight of them stoned the car and finished the windows that had not already been broken. No arrests were made on this occasion, as the officers were unable to identify those who actually participated.

Cleveland Subway Discussed

Underground Line from Superior-Detroit Bridge to Public Square Advocated as Start of a General Subway System

The City Council of Cleveland, Ohio, met as a committee of the whole on June 21 to consider public improvements. One of the matters taken up was the proposition of Mayor Harry L. Davis to build a subway under Superior Avenue between the new Superior-Detroit bridge and the Public Square, with terminals for all lines under the Square. Apparently the idea of a subway was favored by all, but there was a division as to the manner in which it should be done. Mayor Davis believes that it should be put into the hands of a special commission, and Director of Finance Neal said that this plan would make it possible to finance the construction by an issue of bonds outside of the ordinary statutory limitations.

The operation of the subway was also discussed. J. J. Stanley, president of the Cleveland Railway, had informed members of the Council that if a rental plan was arranged the rate of fare would have to be higher. Others thought that the saving and convenience to the company would offset the rental expense. Mr. Neal said the annual charge on a bond issue for this purpose would be $203,000, and he felt that much of this could be provided by rental.

Mayor Davis has since taken the stand that a subway and an underground terminal would be of as much benefit to automobilists, pedestrians and people using teams as to the railroad and its patrons. He therefore argued that the cost should be taken care of from a general tax, so that all may contribute to it. He said that it would be manifestly unfair for the patrons of the railway to bear the whole burden, as would be the case under a rental plan.

It is the idea of Mayor Davis that this short section of subway, with the underground terminal, would merely be the first unit of a subway system which would eventually reach all other lines and result in removing street cars from the surface in the congested section of the city. The city planning commission has recommended that the proposed subway be built, but made no suggestion as to how it should be financed or operated.

Strike Threat in Seattle

Recently Formed Union Presents Demands for Wage Increase and Shorter Day

The Seattle division of the Puget Sound Traction, Light & Power Company was threatened on June 26 with a strike of the men on the railway lines. The trainmen have organized a union affiliated with the Amalgamated Association and are aided by the Rainier Valley Railway organization of Seattle. They have demanded a large wage increase and an eight-hour day. The company has refused these demands, but has consented to the trainmen's request for arbitration. A board of three has accordingly been appointed for arbitration and conferences will be held shortly. The traction company expects no action by the men prior to the arbitration meetings.

The strike is threatened in the face of the fact that the company two days previous to the presentation of the demands by the men announced that on July 1 the Seattle men would receive a raise in wages of 2 cents an hour. A bulletin noting the increase was posted on June 21 by A. L. Kempster, manager of the company. The company also announced that the period of employment required to reach the maximum wage for that class of employment had been reduced to six years. Approximately 1500 men were to benefit by the order.

Up to three years ago the company's rules required employment for a period of fifteen years before trainmen could reach the wage maximum. Not long ago this was reduced to ten years, and on June 21 it was reduced to six years. This is the third increase in wages since the first of the year. The first was made on Jan. 1, another announced originally for July 1 was made effective on May 1, and the third was proposed for July 1. The first two raises were 1 cent an hour each, and the third 2 cents an hour. These increases add a little more than $140,000 to the annual payroll of the company.

Third East St. Louis Arbitrator Chosen.—Frank J. Keating, former city treasurer of East St. Louis, Ill., has been agreed upon as the third member of the arbitration board to decide the matter of wages to be paid employees of the East St. Louis & Suburban Railway. Al. Towers, Belleville, represents the employees, and Charles E. Smith, St. Louis, represents the company. The third arbitrator was selected after it became apparent that there was very little likelihood of Messrs. Towers and Smith being able to reach an agreement.

Fight in Council Over Extension.—The Council of Detroit, Mich., has rejected a report by the public utilities committee directing the corporation counsel to take legal action against the Detroit United Railway if it did not immediately begin work to complete the Grand Belt line. The vote of rejection was twenty-one to twelve. It was followed by the resignation from the committee of Alderman Vernor, chairman of the committee, who contended that the company was obligated to build the line. On the other hand, Alderman Littlefield said that in the four years since the contract was entered into conditions had changed greatly and that the route of the line should be abandoned and an alternate one chosen.

River Tunnel Headings Holed Through.—Oscar S. Straus, chairman of the Public Service Commission for the First District of New York, on June 21 "fired the blast" which connected the south headings of the new Whitehall-Montague Street tunnel underneath the East River. The headings "holed through" on the occasion in question, were the last of the two new downtown rapid transit tunnels being constructed under the dual system of rapid transit contracts. Two other subway tunnels, however, are being constructed further up the East River, one at Fourteenth Street and one at Sixtieth Street. The Whitehall-Montague Street tunnel will form the under-river connection between the Broadway subway in Manhattan and the Fourth Avenue subway in Brooklyn.

Kentucky Assessments Increased.—Assessments of practically all the Kentucky utility corporations have been increased by the Kentucky Board of Valuation and Assessment. The new tax law will go into effect this fall and the

assessments are announced for this year. They are subject to revision after representatives of the companies are heard. Among the assessments announced are the following: Louisville & Southern Indiana Traction Company, $82,783, increased from $57,330; Louisville & Northern Railway & Lighting Company, $53,156; Louisville & Interurban Railway, $2,142,956, increased from $2,115,000; Kentucky Traction & Terminal Company, $1,500,000 increased from $1,200,000; Ohio Valley Electric Railway, Huntington, W. Va., $722,913, increased from $496,681.

Protest Against Paving Unavailing.—In face of a vigorous protest from F. I. Fuller, vice-president of the Portland Railway, Light & Power Company, the City Council of Portland, Ore., recently passed an ordinance providing for the improvement of the East Fiftieth Street from Division Street to Powell Valley Road by paving. In his statement to the Council Mr. Fuller said that his company did not have any franchise from the city for its railway tracks on the street, that it would be unable to bond the cost of its share of the improvement against its franchise, and would have to pay cash. The company was not financially able to meet the expense at this time. He also admitted that employees of the company, because the company had granted them a recent increase in wages, had volunteered to circulate a remonstrance against the improvement in order to save the expense. He asked the Council to take no action until it had investigated the proposal fully. The company's share of the cost of the proposed work will be approximately $41,000. The ordinance was passed by the Council, however, without a dissenting vote.

New York Central Improvement Committee Organized.—Henry W. Hodge of the Public Service Commission for the First District of New York has been elected chairman of the joint conference committee of the Board of Estimate & Apportionment and the Public Service Commission for the First District, named under the Ottinger-Ellenbogen act passed by the last Legislature for the purpose of finding a solution of the New York Central Railroad west side track problems. The other members of the joint conference committee are Public Service Commissioner Charles S. Hervey, Borough Presidents Maurice E. Connolly of Queens; Marcus M. Marks of Manhattan; and Calvin D. Van Name of Richmond. The last three represent the Board of Estimate & Apportionment. The committee has already had one conference with Ira A. Place, vice-president of the New York Central Railroad. Other meetings of the joint conference committee will be held in the near future. One of the questions before the joint conference committee is the removal of the tracks of the railroad from the surface on the west side of the city and their electrification.

Kentucky Passes Void.—Passes issued by common carriers as part of the consideration of a contract prior to the enactment of the Kentucky anti-pass law are void, according to a decision of the Kentucky Court of Appeals handed down on June 22. There were two cases before the court, each seeking mandatory injunction to compel the Kentucky Traction & Terminal Company, Lexington, to continue issuing transportation to plaintiffs and their families. James A. Murray gave a right-of-way through his property to the Capital Railway, predecessor of the Kentucky Traction & Terminal Company, and part of the consideration was perpetual passes for himself and family. The contract was entered into after the adoption of the present State Constitution, which contains a provision prohibiting unfair discrimination in transportation rates and directs the Legislature to enact laws to carry the provision into effect. When the new law became effective the railway canceled the passes, along with numerous others. Murray and others filed suit contending that their passes were given for valuable consideration and that the law, if it affected them, impaired the obligation of a contract and was in contravention of the Constitution. The Court of Appeals, however, said that the contract was entered into in full knowledge of the fact that the Constitution gave the State police powers to prohibit granting of passes, and the anti-pass law prohibited them except in exchange for advertising. The court added: "Whether appellees have a remedy for loss that may result to them from the abrogation of their contracts with the appellant is not now decided."

Financial and Corporate

Annual Reports

United Light & Railways Company

The income statement of the United Light & Railways Company, Grand Rapids, Mich., for the year ended Dec. 31, 1916, follows:

SUBSIDIARY COMPANIES		
*Gross earnings (including $914,644 for inter-company business)		$6,885,779
*Operating expenses and taxes (including $914,644 for inter-company charges)		4,219,386
Net earnings		$2,666,393
Interest and dividends on subsidiary bonds, preferred stocks and notes:		
To United Light & Railways Company	$477,642	
To the public	912,871	1,390,513
Net earnings on stocks—subsidiary companies		$1,275,880
Net earnings due others than United Light & Railways Company		18,389
UNITED LIGHT & RAILWAYS COMPANY		
Earnings available on stocks owned		$1,257,490
Dividends and interest receivable		489,428
Miscellaneous earnings		171,903
Gross earnings		$1,918,821
Expenses	$125,446	
Taxes, general and federal	21,462	146,908
Net earnings		$1,771,913
Interest on first and refunding 5 per cent bonds		403,724
Balance		$1,368,189
Interest on ten year 6 per cent convertible gold debentures	$7,262	
Interest on three and five year notes	135,000	
Interest on commercial loans	32,654	174,916
Balance available for dividends		$1,193,273
Dividends on first preferred stock—6 per cent		595,792
Surplus earnings		$597,480

*This amount of $914,644 represents inter-company transactions, of which $288,185 is for electric power sold to subsidiary railway companies.

From the surplus, $298,353 was credited to the depreciation reserve (of which the United Light & Railways Company's proportion pro rated on its stock holdings of subsidiary companies is $292,859). In addition the subsidiary companies expended or set aside for maintenance an additional sum of $432,112, which was charged directly to operating expenses—making the total expended or set aside for maintenance and depreciation of property $730,466, or more than 12.75 per cent of the gross earnings received from the sale of gas, electricity, heat and transportation.

The operating expenses of subsidiary companies included $295,431 accrued for payment of general and federal taxes, an increase of $34,057 for the fiscal year, and also substantial increases in wages paid to all classes of employees.

The gross business of the company in all departments showed a substantial increase, but owing to the increased cost of materials and wages involved in operation, increased general and federal taxes, and to material reductions made in gas and electric rates, the net earnings, while satisfactory, did not show such a large proportionate increase. The revenue passengers of all classes carried on the railways were 38,013,075, an increase of 4,484,082 or 13.37 per cent. Below is a comparative statement indicating the sources of revenue both gross and net, and the percentage each class of service bore to the total:

	1916	Per Cent of Total	1915	Per Cent of Total
Gross Earnings:				
Gas	$1,353,805	19.66	$1,318,922	20.91
Residuals	92,709	1.35	122,934	1.95
Electric	2,587,459	37.58	2,322,983	36.82
Railway—City lines	1,806,218	26.23	1,599,459	25.35
Railway—Interurban	868,601	12.61	791,361	12.55
Heat	86,215	1.25	81,004	1.28
Miscellaneous	90,770	1.32	72,109	1.14
Total	$6,885,779	100.00	$6,308,776	100.00
Net earnings:				
Gas	$564,160	21.16	$611,353	24.64
Electric	1,152,546	43.22	1,101,701	44.40
Railway—City lines	571,968	21.45	439,867	17.73
Railway—Interurban	300,693	11.28	254,143	10.24
Heat	10,745	.40	19,732	.79
Miscellaneous	66,280	2.49	54,714	2.20
Total	$2,666,393	100.00	$2,481,514	100.00

During 1916 $1,474,274 was expended for additions to properties and extensions of service. Of this total $271,078 was for gas properties, $537,474 for electric properties, $619,333 for railway properties and $46,387 for heating properties. Expenditures made for construction were largely in the nature of natural extensions of gas, electric and railway service, due to the growth of the communities served—in some cases to complete work started in the year 1915.

Omaha & Council Bluffs Street Railway

The comparative statement of income, profit and loss of the Omaha & Council Bluffs Street Railway, Omaha, Neb., for the calendar years 1915 and 1916 follows:

	1916		1915	
	Amount	Per Cent	Amount	Per Cent
Revenue from transportation	$3,069,324	94.35	$2,839,180	94.76
Revenue from other operations	184,003	5.65	156,898	5.24
Gross operating revenues	$3,253,327	100.00	$2,996,079	100.00
Operating expenses	1,833,146	56.35	1,656,643	55.29
Net operating revenue	$1,420,180	43.65	$1,339,435	44.71
Taxes assigned to railway operations	288,679	8.85	.....	....
Operating income	$1,131,501	34.80	.....	....
Miscellaneous income	14,839	0.45	12,919	0.43
Gross income	$1,146,340	35.25	$1,352,355	....
Deductions from income*	636,204	19.56	872,010	....
Net income	$510,136	15.69	$480,344	16.04
Dividends	400,000	12.30	412,500	13.77
Surplus for year	$110,136	3.39	$67,844	2.27

*In 1916 these include only $296 for miscellaneous taxes, but in 1915 they included $240,660, no assignment to railway operations being made.

The 1916 gross operating revenues, compared with 1915, show an increase of $257,248 or 8.59 per cent. The operating expenses increased $177,003 or 10.69 per cent, so that the net operating revenue gained $80,745 or 6 per cent.

On July 1, 1916, the wage scale for trainmen was increased 1 cent per hour, making an increase in the payroll of about $30,000 for the last six months of 1916. At the same time a general increase in wages was made in the shops and all other operating departments. These increases, together with increased cost of all materials and fuel, make up a large part of the increased cost of operation. In addition to these increases the charge to operating expenses for depreciation was increased by $60,000, and $41,000 additional was set aside for injuries and damages.

Taxes for the year amounted to $288,679, an increase of $51.167. The net income for 1916 represented an increase of $29,792 or 6.2 per cent. After paying $200,000 in preferred dividends at 5 per cent and the same amount in common dividends at 4 per cent, the company charged out $15,782 for losses, and $50,000 for a miscellaneous reserve to cover purchased securities. Notwithstanding these increases in reserves and expenses, the actual net earnings for the year, added to surplus, amounted to $48.449. The balance shown in accrued depreciation as of Jan. 1, 1917, was $1,383,069. The sum of $175,179 was charged to this account during the year for rebuilding tracks and other replacements. During the year $137,318 was expended for additions and betterments.

The annual report states that the elimination of jitneys, on account of their inability to carry passengers in competition with the company, added a considerable sum to the gross earnings in 1916 as compared with last year. The growth of the cities served was the principal factor, while the good times and activity in all lines of business, together with favorable weather conditions, contributed to the final result.

Bucks County Interurban Railway, Newtown, Pa.—All of the $400,000 of outstanding first mortgage 5 per cent thirty-year bonds of the Trenton, New Hope & Lambertville Street Railway, secured by mortgage of the company to the Trenton Trust & Safe Deposit Company, dated Aug. 1, 1904, will be redeemed and paid at the rate of $1,100 for each $1,000 bond, together with accrued interest, if presented at the office of the trustee on Aug. 1, 1917. The Bucks County Interurban Railway is a consolidation of the Trenton, New Hope & Lambertville Street Railway, Yardly, Morrisville & Trenton Street Railway, Newtown & Yardly Street Railway and the Bucks County Electric Railway.

Cities Service Company, New York City.—The abolition of the present par value of $100 and the exchange of ten shares of new common stock without par value for each one of the present issue was recommended to the directors of the Cities Service Company by a special committee at a meeting of the board on June 22. Application to the New York Stock Exchange for the listing of both the preferred and the common stocks of the Cities Service Company was also favored. Both matters were referred to counsel for their report. A suggestion that debenture bonds be issued as a method of future financing of the Cities Service Company and its subsidiaries by stockholders was adversely reported, so far as action at this time is concerned. The retirement or refunding of subsidiary bonds by this method was objected to by the committee because, owing to the small proportion of such issues with early maturity, the profits in such financing would be used up in called premiums instead of benefiting the stockholders.

General Gas & Electric Company, New York, N. Y.—The holders of the cumulative preferred stock of the General Gas & Electric Company have received circulars stating that the July 1 quarterly dividend declaration has been deferred because of the increases in fuel costs. W. S. Barstow, president of the company, says in part: "Up to a short time ago, the board of directors decided that the discontinuing of the dividends on the cumulative preferred stock would not be necessary. In view, however, of the actual results during the first part of this year, the directors are now unanimous in feeling that it is clearly their duty to defer at this time the declaration of the quarterly dividend on the cumulative preferred stock due July 1. Dividends on this stock, however, are cumulative and as soon as the affairs of the company return to a more normal basis the dividends due on this stock must be made up before any dividends can be paid on any other stocks of the company. The gross revenues of the subsidiary companies are increasing steadily over the corresponding periods of last year. Furthermore, public service commissions are now generally approving increases in rates which have been clearly shown to be productive of a loss to the company. The companies have not, however, received the actual benefit of any such increases up to the present time. For the first four months of this year the increase in the gross revenues of the subsidiary companies has been $76,160 as compared with the same period of last year. The increased operating expenses and taxes, however, for the same four months, which under normal conditions should not have exceeded $46.000 were actually $134,606."

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—The Ohio Public Utilities Commission on June 21 authorized the consolidation of the Youngstown & Sharon Railway, the Mahoning Valley Railway, the Youngstown Park & Falls Railway, the Mahoning Valley Southeastern Railway and the Poland Street Railway with the Mahoning & Shenango Railway & Light Company. Considerations of economy and a desire to centralize the management brought about the decision to consolidate the companies. A syndicate, composed of Lee, Higginson & Company, New York; Drexel & Company, Reilly, Brock & Company, and Graham & Company, Philadelphia, have purchased $500,000 of Mahoning & Shenango Railway & Light Company 5 per cent bonds, due November, 1920, which are being offered at 97½, to yield 5.80 per cent.

Middle West Utilities Company, Chicago, Ill.—The stockholders of the Middle West Utilities Company, at the annual meeting held in Wilmington, Del., recently, approved the proposed amendment of the company's charter and authorized the proposed increase in the preferred and common stocks to $20,000,000 each. The directors were all re-elected.

Monongahela Valley Traction Company, Fairmont, W. Va.—The Monongahela Valley Traction Company has declared an extra dividend of $1.25 a share in addition to the regular quarterly dividend of $1.25 a share on the common stock. A dividend of 83 1/3 cents a share has also been declared on the preferred stock, for two months, payable on July 5

to holders of record of June 30. The usual dividend on the common stock is payable on July 16 and the extra on Aug. 16, both to holders of record of June 30. The stockholders of the company are reported to have authorized an increase in the capital stock of the company from $12,000,000 to $16,000,000, of which $4,000,000 is 6 per cent preferred and the balance common stock. At the same time the parity of the stock has been reduced from $100 to $25.

Morris County Traction Company, Morristown, N. J.—Bondholders of the Morris County Traction Company held a meeting at Morristown recently and heard the report of a committee of nine, appointed about three months ago to inquire into the finances of the company. As a result a readjustment of the finances has been agreed upon. The company at present has outstanding $3,000,000 of first mortgage bonds, $1,179,000 of second mortgage bonds and $300,000 of stock. The second mortgage bondholders have agreed to the substitution of income bonds for their holdings. The holders of the first mortgage bonds have agreed that the coupons representing interest now unpaid on the first mortgage bonds shall be cut off and deposited with the National Iron Bank of Morristown and that for the coupons for the next five years shall be substituted new coupons calling for the payment of 1 per cent every six months, beginning next December.

Northern States Power Company, Chicago, Ill.—The Guaranty Trust Company, Harris Forbes & Company, William P. Bonbright & Company, Inc., and H. M. Byllesby & Company, Chicago, Ill., are offering for subscription at 93½ and interest yielding about 5½ per cent $3,500,000 of Northern States Power Company first and refunding mortgage 5 per cent gold bonds dated April 1, 1916, and due April 1, 1941. The amount of these bonds outstanding, including the present issue, is $21,500,000. There are also outstanding $7,556,000 of first mortgage 5 per cent bonds of the Minneapolis General Electric Company, $7,805,000 of ten-year gold notes, $13,233,300 of 7 per cent cumulative preferred stock and $6,170,000 of common stock.

Orleans-Kenner Electric Railway, New Orleans, La.—Some time ago Allen H. Johness, president of the General Realty Company, announced he had formed a local syndicate to take over the property of the Orleans-Kenner Electric Railway and that all the necessary cash had been subscribed. Johnson & Company, controlling the company, had borrowed $150,000 from Bertron, Griscom & Company, New York. Recently when it was reported that the New Orleans Railway & Light Company would secure the property through Johnson & Company Jefferson parish property holders entered a protest. Francis T. Homer of the firm of Bertron, Griscom & Company, who is also president of the American Cities Company, which controls the New Orleans Railway & Light Company, then said his firm would relinquish to the Jefferson parish people all its rights if they would arrange to take care of the indebtedness. Mr. Homer said recently he knew of nothing new in the situation except that the firm had received a letter from J. D. Purcell, who put up most of the original capital for the line, saying the deal with the Johness syndicate was off. Mr. Johness later is reported to have said the negotiations were discontinued partly on account of conditions affecting the property which have originated since an act of purchase was drawn up.

Pittsburgh & Butler Railway, Pittsburgh, Pa.—The property and franchises of the Butler Passenger Railway, which was consolidated with the Pittsburgh & Butler Street Railway in March, 1914, to form the Pittsburgh & Butler Railway, were purchased on June 12 at public sale by Attorney C. F. Hosford, Butler, acting for the bondholders' protective committee of the company. The price paid was $250,000. The public sale of the property and franchise of the company under the decree of the court was fixed for May 9, but as the bids received then were unsatisfactory the sale was postponed to June 12. The property of the Pittsburgh & Butler Street Railway, which with the Butler Passenger Railway went to make up the Pittsburgh & Butler Railway, was purchased under foreclosure on May 9 for $670,250 by R. H. Boggs, president of the Pittsburgh, Harmony, Butler & New Castle Railway, presumably in the interest of that company.

Springfield (Mass.) Street Railway.—The Springfield Street Railway has petitioned the Massachusetts Public Service Commission for approval of an issue of $3,377,000 of twenty-year 6 per cent bonds for general improvements and to pay outstanding debts.

Wisconsin Valley Electric Company, Wausau, Wis.—The First National Bank and Morris F. Fox & Company, Milwaukee, Wis., are offering at 97 and interest $925,000 of first and refunding mortgage 5 per cent bonds of the Wisconsin Valley Electric Company. The bonds are dated May 1, 1917, and are due May 1, 1942, but are callable at 102 and interest on any interest date. The proceeds from the sale of these bonds and of certain stock are to be used to reimburse the company for the purchase of the Merrill and Stevens Point properties, extending the transmission line and for additions.

Dividends Declared

Bangor Railway & Electric Company, Bangor, Me., quarterly, 1¾ per cent, preferred.

Boston & Worcester Electric Companies, Boston, Mass., $1, preferred.

Capital Traction Company, Washington, D. C., quarterly, 1¼ per cent.

Central Illinois Public Service Company, Mattoon, Ill., quarterly, 1½ per cent, preferred.

Chicago City & Connecting Railways, $1.50, preferred participating certificates.

Chicago (Ill.) City Railway Company, quarterly, 2 per cent.

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., quarterly, 1⅛ per cent, preferred; quarterly, 1½ per cent, common.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

Cities Service Company, monthly, ½ of 1 per cent, common and preferred; ½ of 1 per cent, common, payable in common stock.

Consolidated Traction Company of New Jersey, Newark, N. J., 2 per cent.

International Traction Company, Buffalo, N. Y., quarterly, 1¾ per cent, on 7 per cent cumulative first preferred; quarterly, 1 per cent, on 4 per cent cumulative preferred; 1 per cent, common.

Iowa Railway & Light Company, quarterly, 1¾ per cent, preferred.

Little Rock Railway & Electric Company, Little Rock, Ark., 3 per cent, common and preferred.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Mohawk Valley Company, New York, N. Y., quarterly, 1½ per cent.

New England Investment & Security Company, Springfield, Mass., 2 per cent, preferred.

New Orleans Railway & Light Company, New Orleans, La., quarterly, 1¼ per cent, preferred.

New York State Railways, New York, N. Y., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Nova Scotia Tramways & Power Company, Halifax, N. S., 3 per cent, preferred.

Philadelphia & Western Railway, Upper Darby, Pa., quarterly, 62½ cents, preferred.

Porto Rico Railways, Ponce, P. R., quarterly, 1¾ per cent, preferred.

Reading (Pa.) Traction Company, 75 cents.

Republic Railway & Light Company, Youngstown, Ohio, quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

Ridge Avenue Passenger Railway, Philadelphia, Pa., quarterly, $3.

Washington Water Power Company, Spokane, Wash., quarterly, 1 per cent.

West India Electric Company, Ltd., Kingston, Jamaica, quarterly, 1¼ per cent.

Wisconsin Edison Company, Inc., New York, N. Y., quarterly, 50 cents.

Electric Railway Monthly Earnings

CITIES SERVICE COMPANY, NEW YORK, N. Y.

Period			Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1 m.,	May,	'17	$1,565,425	$28,341	$1,537,084	$234	$1,536,850
1 "	"	'16	709,085	20,113	688,972	44,121	644,851
12 "	"	'17	15,218,272	287,038	14,931,234	42,624	14,888,610
12 "	"	'16	6,012,968	201,343	5,811,625	503,454	5,308,171

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, ME.

1m.,	Apr.,	'17	$233,439	*$158,628	$74,811	$66,499	$8,312
1 "	"	'16	211,944	*134,794	77,150	66,287	10,863
12 "	"	'17	2,959,916	*1,893,698	1,066,218	810,671	255,547
12 "	"	'16	2,717,239	*1,591,665	1,125,574	798,254	327,320

KANSAS CITY (MO.) RAILWAYS

1 m.,	May,	'17	$627,086	*$432,652	$194,434	$129,769	††$41,961
1 "	"	'16	642,691	*410,991	231,700	117,819	††53,898
12 "	"	'17	6,778,017	*4,558,355	2,220,662	1,430,640	††441,393
12 "	"	'16**					

KEY WEST (FLA.) ELECTRIC COMPANY

1 m.,	Apr.,	'17	$10,874	*$7,291	$3,583	$2,511	$1,072
1 "	"	'16	9,759	*5,930	3,829	2,519	1,310
12 "	"	'17	122,673	*82,859	39,814	30,196	9,618
12 "	"	'16	113,292	*76,659	36,633	30,542	6,091

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

1 m.,	Apr.,	'17	$68,053	*$50,275	$11,778	$15,702	$2,076
1 "	"	'16	60,400	*41,224	19,176	16,120	3,056
12 "	"	'17	836,375	*596,756	239,619	185,585	54,034
12 "	"	'16	754,476	*496,289	258,187	191,663	66,524

NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1 m.,	Apr.,	'17	$201,591	*$130,576	$71,015	$40,714	$30,301
1 "	"	'16	193,641	*113,361	80,280	42,815	37,465
12 "	"	'17	2,423,840	*1,511,622	912,218	501,198	411,020
12 "	"	'16	2,207,502	*1,358,923	848,579	514,503	334,076

NORTHERN OHIO TRACTION & LIGHT COMPANY, AKRON, OHIO

1 m.,	Apr.,	'17	$528,240	$312,917	$215,323	$83,919	$131,404
1 "	"	'16	399,830	192,744	207,086	95,436	111,650
4 "	"	'17	2,020,328	1,217,468	802,860	329,358	473,502
4 "	"	'16	1,518,582	726,719	791,863	388,986	402,677

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

1 m.,	Apr.,	'17	$175,359	*$104,007	$71,352	$29,158	$42,194
1 "	"	'16	146,494	*91,984	54,510	28,724	25,786
12 "	"	'17	2,028,964	*1,200,271	828,693	348,357	480,336
12 "	"	'16	1,801,013	*1,099,351	701,662	337,140	364,522

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

1 m.,	Apr.,	'17	$23,865	*$18,822	$5,043	$7,196	†$2,153
1 "	"	'16	24,384	*15,899	8,485	7,137	1,348
12 "	"	'17	311,379	*229,879	81,500	86,465	4,965
12 "	"	'16	296,777	*179,699	117,078	89,444	27,634

PENSACOLA (FLA.) ELECTRIC COMPANY

1 m.,	Apr.,	'17	$24,057	*$15,189	$8,868	$7,813	$1,055
1 "	"	'16	23,391	*12,657	10,734	7,678	3,056
12 "	"	'17	290,118	*167,831	122,287	92,899	29,388
12 "	"	'16	271,383	*150,630	120,753	87,617	33,136

PHILADELPHIA (PA.) RAPID TRANSIT COMPANY

1 m.,	May,	'17	$2,570,440	$1,436,859	$1,133,581	$810,894	$322,687
1 "	"	'16	2,391,370	1,296,001	1,095,369	815,599	279,770
11 "	"	'17	26,027,835	14,599,131	11,428,704	8,953,108	2,475,596
11 "	"	'16	23,526,374	13,106,169	10,420,205	8,977,507	1,442,698

PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m.,	May,	'17	$474,433	$224,584	$249,849	$217,826	$32,023
1 "	"	'16	445,223	212,914	232,309	225,705	6,604
12 "	"	'17	5,647,205	2,538,931	3,108,274	2,696,308	411,966
12 "	"	'16	5,457,872	2,565,914	2,891,358	2,699,644	192,314

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1 m.,	Apr.,	'17	$754,687	*$460,884	$293,803	$191,025	$102,778
1 "	"	'16	645,088	*422,900	222,188	184,290	37,898
12 "	"	'17	8,571,266	*5,244,570	3,326,696	2,241,688	1,085,008
12 "	"	'16	7,643,873	*4,879,073	2,764,800	2,192,916	571,884

REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

1 m.,	May,	'17	$371,745	*$257,291	$114,454	$82,638	‡$37,984
1 "	"	'16	326,400	*199,694	126,706	68,446	‡61,443
12 "	"	'17	4,228,747	*2,623,123	1,605,624	895,941	‡738,895
12 "	"	'16	3,523,962	*2,079,992	1,443,970	743,054	‡713,232

SAVANNAH (GA.) ELECTRIC COMPANY

1 m.,	Apr.,	'17	$76,968	*$51,554	$25,414	$23,908	$1,506
1 "	"	'16	64,897	*43,257	21,640	23,501	†1,861
12 "	"	'17	867,963	*574,882	293,081	285,198	7,883
12 "	"	'16	785,244	*523,311	261,933	261,934	†16,744

TAMPA (FLA.) ELECTRIC COMPANY

1 m.,	Apr.,	'17	$82,261	*$47,183	$35,078	$4,372	$30,706
1 "	"	'16	78,959	*44,595	34,364	4,394	29,970
12 "	"	'17	983,651	*537,088	446,563	52,305	394,258
12 "	"	'16	987,491	*515,777	471,714	52,221	419,493

*Includes taxes. †Deficit. ‡Includes non-operating income.
**During the fiscal year to February 14, 1916, the property was operated by the receivers under the old securities; and the figures for this period, being without value in a comparative statement, are not shown here.
††Includes addition of miscellaneous income and deduction of Kansas City surplus reinvested in plant.

Traffic and Transportation

Seattle Service Decision

A Review of the Issues Involved and the History of the Case Upon Which U. S. Supreme Court Passed on June 11

The Supreme Court of Washington, D. C., on June 11, in the case of the Puget Sound Traction, Light & Power Company, Seattle, appellant, against the State Public Service Commission, appellee, affirmed the judgment of the district court for the Western District of Washington. The traction company asked the district court for a temporary injunction restraining the commission, after a trial on its merits, from enforcing so much of a commission order as the company alleged violated the fourteenth amendment of the Constitution, Art. 1, Sec. 10, and the public service law of the State. The order directed:

"That the defendant furnish sufficient cars to provide seats for substantially all persons using the Alki Point and Fauntleroy Park lines."

A temporary injunction was granted as to the third section of the order, but denied as to the remainder. Appeal was from this denial, but the Supreme Court affrmed the action of the district court. The application of the company for an injunction on the first and second sections of the commission's order will now be heard on its merits in the district court.

James B. Howe, general counsel for the company, states that the decision of the Supreme Court does not finally determine the main questions at issue. Mr. Howe is quoted as follows:

"Our original complaint had to do only with the Alki and Fauntleroy Park lines, mentioned in the decision of the Supreme Court. We have filed an amended complaint, showing the situation as affecting the entire Seattle system, and we are now fully confident, in view of the decision on June 11, that our contention will be sustained by the court on the final argument."

HISTORY OF THE CASE

The Puget Sound Traction, Light & Power Company was the owner of two franchises under which were operated two street railway lines known as the Fauntleroy line and the Alki line. The franchises for these lines terminated at the intersection of Yesler Way and First Avenue. From Yesler Way north to Virginia Street the company owned another line operated under another franchise. The Public Service Commission made an order requiring the company to operate the Fauntleroy and Alki cars so that instead of passengers paying a 5-cent fare and obtaining a transfer at the intersection of Yesler Way and First Avenue, in order to entitle them to proceed further north, they must be carried in the same car from the southern terminals of the Fauntleroy and Alki lines to Virginia Street, and from Virginia Street south to the southern terminals of those lines, without change. The effect of this order enabled passengers to travel on a 4-cent ticket instead of for a 5-cent fare and obtain a transfer. The commission also made an order requiring the company to furnish every passenger with a seat except in case of emergency.

The company filed a complaint in the federal court and attacked the order of the commission, on the ground that the order constituted a violation of the contract contained in the company's franchise and deprived it of its property without due process of law. The Fauntleroy and Alki lines never paid operating expenses, and the court found that as the lines extended over tidelands, which were unsettled, the greater the amount of business done by the company the greater would be the loss to the company, owing to the long haul. The court denied the company relief upon the ground that it did not appear from the complaint that the other lines of the company did not produce a fair return on the value of all of the company's street railway system.

A temporary injunction was granted as to that part of the order requiring a seat for every passenger, and denied as to that part which required through service. An amended complaint was filed by the company, alleging that the return from the entire street railway system was inadequate, and the case is still pending on the amended bill.

An appeal from the order denying a temporary injunction was taken to the Supreme Court of the United States, but the order of the district court was affirmed. A copy of the opinion of the Supreme Court had not yet been received in Seattle when this account was prepared, but it is understood that the Chief Justice and Justices McKenna and McReynolds dissented. It is also understood from the newspaper report that the court held it incumbent upon the company to show that its street railway system did not produce a fair return, and in the absence of such showing, no relief could be had because particular lines failed to earn operating expenses.

The company contended that inasmuch as each line was constructed and operated under a separate franchise, which was sold by the city to the highest bidder, the fact that the various franchises subsequently were vested in a single owner did not change the obligations of the owner from those stated in the franchises. The company also contended that, it having been admitted that the reason the two lines were operated at a loss was not from lack of business but because the fare allowed by law was less than a reasonable rate and less than the value of the service rendered, the company was deprived of its property without due process of law, even though from other property the revenue was sufficient to yield the company a return on the value of all of its property.

The case will proceed to trial upon the amended bill and will probably be disposed of on its merits within the next six months.

Employees' Bulletin for M. V. T.

The Monongahela Valley Traction Company, Fairmont, W. Va., has issued the first number of a publication called the *M. V. T. Company Employees' Magazine.* The paper is edited by Shannon Allen and will be published on the fifteenth of each month. The first issue contains thirty-four pages of editorial matter with main departments as follows: General News, Editorials, Railway, Mining, Gas, Power and Home and Garden. Advertising is also carried. A short message in this number from General Manager E. B. Moore to the employees contains the following paragraph:

"The business of this company is very diversified, consisting of railways, electric lighting, power, natural gas and coal mining, and a little later artificial gas will be added. Due to this diversity there is practically no personal contact between the employees of some of the different departments. I hope this magazine may be the means of bringing about a closer relationship and unity of interest among all employees, including the officials, who, of course, are employees, too."

Texas Has New Traffic Law

The State of Texas has enacted a new State highway law which became effective June 20. The law provides for the licensing of motor vehicles to produce revenue which will be used in improving the State roads. Jitneys are affected inasmuch as a commercial vehicle within the terms of the act is held to be any vehicle carrying passengers or freight for hire. The act takes from the various cities the right to tax automobiles or other motor vehicles, and imposes a State license tax of 35 cents per horsepower on pleasure automobiles, with a minimum charge of $7.50 and a graduated tax ranging from $25 to $300 a year on commercial automobiles according to their gross weight. It provides that no other license tax shall be imposed by city or county. This provision, it is claimed, will prevent any city from imposing a regulatory tax, which will mean that the cities will have no supervision over jitney buses operating on their streets. This point will likely find its way into the courts for judicial determination and the cities will make a strong fight for their right to regulate jitneys.

Jitneys in Dallas are now operating practically without restriction, since the enforcement of the ordinance recently approved by the voters of Dallas, which was initiated by the members and friends of the Jitney Drivers' Association, has been enjoined by the railway companies. Several commissioners of Dallas, however, have expressed their determination to enact other regulatory measures. Commissioner Doran has come out openly for an ordinance that will restrict the jitneys to certain streets and impose on them a tax, such tax to go into a fund for the maintenance of paving. He declares that the jitneys use the paved streets and as a matter of equity should contribute liberally to their original cost and upkeep.

I. U. T. Safety-First Banquet Canceled.—The semi-annual safety-first banquet of the Union Traction Company of Indiana, Anderson, Ind., which was to have been held this month, was canceled on account of the present national conditions.

Free Transfers Asked in Duluth.—Park Point residents have petitioned the City Council of Duluth, Minn., to bring pressure to bear upon local traction companies to secure free transfer privileges between the lines of the Duluth Street Railway, which serves the city proper, and the Park Point Traction Company, which serves Minnesota Point only. The lines are separated by the Duluth ship canal and a charge of 2 cents is now made for transfers.

Women to Check Traffic.—The Beaver Valley Traction Company, New Brighton, Pa., is planning to employ women to check traffic. An advertisement in the local papers on June 23 reads as follows: "Wanted: Five women to check traffic; must be ex-school teachers, teachers on vacations or women of equal school training. Short hours. Good pay. Apply in own handwriting or in person to the Beaver Valley Traction Company, Junction Park Office, New Brighton."

Jersey Road Wants 6-Cent Fare.—The North Jersey Rapid Transit Company, Hohokus, N. J., operating between Warren Point and Suffern, N. Y., has applied to the State Board of Public Utility Commissioners for permission to increase its fare from 5 cents to 6 cents. H. H. Parmelee, receiver for the company, asked the commission to authoize an increase of fare to 6 cents in the local municipalities through which the line is operated. After the hearing the testimony was laid over for action by the board after conference.

Jitney Insurance Company Quits Newark Field.—The Manufacturers' Liability Insurance Company, Jersey City, N. J., which has been bonding some of the jitneys in Newark, has decided to abandon the Newark field and has canceled the seventy-five policies it held there. The company is a mutual concern sharing its profits with the policyholders. It is said that the reason for this action was that the prevalence of jitney accidents in Newark made the business unprofitable. It is said the policies will be taken over by the Manufacturers' Casualty Insurance Company, Philadelphia, Pa.

Pennsylvania Commission Lowers Fare.—The Public Service Commission of Pennsylvania has ordered the Eastern Pennsylvania Railways to reduce its fare to 5 cents instead of 10 cents, now charged on its line from Pottsville to the limits of the former Yorkville borough. The change is the result of years of effort of the Pottsville Retail Merchants' Association. The company had sought to justify the former fare on account of rentals paid to the People's Railway, which owns the charter rights and original roadbed. Under the agreement between the companies the more passengers carried the higher is the rental.

Springfield to Improve Jitney Regulation.—A new jitney ordinance being considered by the City Council of Springfield, Mass., would prohibit persons engaged in other occupations from operating passenger-carrying automobiles and would bond each driver to the extent of $1,000 instead of bonding the machine owners, as at present. It is hoped to eliminate objectionable features of the ordinance passed last year. Part-time operators will probably be prohibited from obtaining a license in order to decrease the number of jitneys and force incompetent drivers out of business. Other clauses relate to the display of signs, number of working hours, the operating routes and similar measures.

Temporary Franchise Amendment Proposed.—Two measures, which are intended to give the Virginia Railway & Power Company relief from the increased cost of operation and maintenance, were presented recently before the Board of Aldermen of Richmond, Va. The ordinances were drawn in the form of amendments to franchises held by the company. They would abolish school children's and workingmen's tickets, which are now sold at the rate of six for 25 cents, and would also grant the company the privilege of issuing only one transfer. A 10-per cent city tax on the company's gross receipts is specified to replace the graded tax in effect at present. The ordinances are said to be virtually war measures since the operative period has been set at only five years.

Newspaper Publicity for Kansas City Railways.—An interesting development of the publicity department maintained by the Kansas City (Mo.) Railways is that it is answering many queries and complaints to the newspapers directed against the car service. One of the newspapers conducts a "Speaking the Public Mind" column, where, in the past, criticisms of the company were published. Recently the editor of that department has been sending some of the communications to the railway company and its publicity department provides the correct information even though the response must be the frank admission that an employee had exceeded his authority or that the condition was one which had not yet been remedied though a solution was being sought.

Hearings Begun on Freight Advance.—The Public Service Commission for the Second District of New York on June 23 began its investigation of the 15 per cent advance in freight rates proposed by the carriers of the State. All the railroads operating in the State were represented and produced copies of statements filed with the Interstate Commerce Commission showing approximate estimates of increased cost of coal, labor and material and estimates of prospective earnings on the proposed advanced rates, using the business of 1916 as a basis and following along the same lines of proof as they did before the Interstate Commerce Commission. The hearing has now been closed and the interested parties have received permission to file briefs not later than June 27 to support their contention.

H. C. L. Kills the Louisville Jitneys.—Competition of the jitney with the Louisville (Ky.) Railway will formally fade away on July 1, according to an announcement made by the Louisville Jitney Bus Company to the effect that the high cost of living has rendered the venture unprofitable. It is understood that thirty-four buses are authorized to operate under the blanket liability bond carried by the company. During the two years since the buses began to operate gasoline has advanced in price from 9 cents to 24 cents with the result that the business has not been profitable. Operators have been dropping out until service is given on only two instead of on all of the principal streets of the city as formerly. It is said that some free-lance buses are in operation that do not observe the city ordinance requiring a $5,000 liability bond, but they do not constitute serious competition.

Trials of "Free-Bus" Operators Begun.—Lester Thayer, first of the seventy-nine jitney drivers on trial in Seattle, Wash., charged by the Puget Sound Traction, Light & Power Company with operating without the $2,500 bond required by law, was discharged by Justice Otis Brinker after he had produced an alibi. Thayer was charged with having carried for hire in his "free-donation" bus, O. A. Wise, an investigator for the traction company, on June 1. Thayer proved that he was not operating his bus on that date. Judge Brinker announced that the other seventy-eight cases will be taken up as soon as possible. Attorneys for the defendants say that they will demand a separate trial and jury in each case. Arrests of jitney drivers for the second and third times on criminal charges for operating without a surety bond have been discontinued. The prosecuting attorney of King County gave notice to the Puget Sound Traction, Light & Power Company that no more complaints would be issued by his office against jitney drivers who were already at liberty under bond charged with having violated the bonding law.

Legal Notes

CHARTERS, ORDINANCES, FRANCHISES

FEDERAL COURTS.—*Generating Electric Power for Railway Service is Public Use Even if There is a Sale of Surplus Power.*

The condemnation of certain water rights by a street and interurban railway company, conformably to the local law, cannot be said to be for a private use, on the ground that the contemplated works will produce much more power than will be needed for the railway, when the company's charter empowers it to sell the surplus power and the taking, according to the findings of the state courts, was with intent in good faith to carry on the public business authorized by the charter, *i. e.*, to build and operate a railway between points named, and it was further found that it was necessary to generate electric power on the stream in order to operate the railway, and that, in order fully to develop the company's water power for such purpose, it was necessary to condemn the rights in question. (Hendersonville Light & Power Company and Saluda-Hendersonville Interurban Railway v. Blue Ridge Interurban Railway, 37 Supreme Court Rep., 440.)

NEW YORK.—*Power House Repair Shop a "Factory," and Hours of Rest Are Required.*

The labor law defines a "factory" as including any mill, workshop, or other manufacturing or business establishment, where one or more persons are employed at labor, except power houses, generating plants, barns, storage houses, sheds, and other structures owned or operated by a public service corporation, other than construction or repair shops. Defendant, a subsidiary corporation of a city rapid-transit company, maintained in the basement of its power house a machine shop, operated by power, where repairs were made and small parts manufactured and kept in stock. The machinists assembled parts and adjusted them when machines broke down. Held, that such machine shop was a factory, within the statute requiring twenty-four consecutive hours of rest in every calendar week. (People v. Transit Development Company, 165 New York Sup., 114.)

LIABILITY FOR NEGLIGENCE

KENTUCKY.—*Trespass Committed When Car Left Track.*

Where defendant's street car left the track and ran into the house of plaintiff, thereby injuring her, a trespass was committed, and she may recover without showing negligence on the part of the motorman. (Kentucky Traction & Terminal Company v. Grimes, 194 Southwestern Rep., 1048.)

PENNSYLVANIA.—*Beginning of the Passenger Relation.*

One boarding a street car intending to become a passenger, even though no fare has been collected before he sustains injury, is a passenger, and not a trespasser simply because he entered in an illegal manner and in violation of company's rule. (Berkebile v. Johnstown Traction Company, 99 Atlantic Rep., 871.)

WEST VIRGINIA.—*Federal Employers' Liability Act Does Not Apply to Employees in City Service of Interstate Line.*

An electric railway company which operates an urban car line, and also other lines connecting therewith and extending into another state, is both an intrastate and in interstate carrier. But the federal employers' liability act (Act Cong. April 22, 1908, Chap. 149, 35 Stat. 65 [U. S. Comp. Stat. 1913, Secs. 8657-8665]), does not apply in the case of injury to a servant of such company, who is operating a street car, confined to the urban lines and not, at the time of injury, carrying interstate passengers or traffic. To make the federal act applicable, the injured servant must be engaged in interstate commerce at the time of injury. (Watts v. Ohio Valley Electric Railway, 88 Southeastern Rep., 659.)

Personal Mention

T. G. Lowry has been appointed chief engineer of the Peoria (Ill.) Railway Terminal Company.

R. A. Becker has been appointed engineer of overhead construction for the Southern Illinois Light & Power Company, Hillsboro.

J. K. Blish has been elected vice-president of the Galesburg & Kewanee Electric Railway, Kewanee, Ill., succeeding H. W. Crane.

John Roach has been appointed roadmaster of the East St. Louis & Suburban Railway, East St. Louis, Ill., succeeding J. C. Dew.

John H. Boyd has been appointed treasurer of the Uncanoonuc Incline Railway & Development Company, Manchester, N. H.

James G. White, president of J. G. White & Company, Inc., New York, has been elected second vice-president of the Merchants' Association of New York for the coming year.

Paul Reinking, who for several years has been auditor of the Fort Wayne & Decatur Traction Company, Decatur, Ind., has resigned to take a position with the Fort Wayne Corrugated Paper Company.

A. H. Cady has been made acting superintendent of the Detroit, Jackson & Chicago Railway, Detroit, Mich., in the place of William J. Dawson, who has been placed in temporary charge of the employment department of the Detroit United Railway, which controls the former company.

William J. Dawson, superintendent of the Detroit, Jackson & Chicago Railway, which is controlled by the Detroit (Mich.) United Railway, has been appointed acting superintendent of employment of the latter company, succeeding A. F. Brown, who has been kept from his duties on account of illness.

A. B. Coryell, who for the last four years has been superintendent and purchasing agent for the Moncton Tramway Electricity & Gas Company, Moncton, N. B., has resigned, effective July 1, to enter business for himself in Buffalo, N. Y. Mr. Coryell has been engaged in electric railway and lighting work for more than twenty-five years. During this time he has had charge of the construction and management of properties in different parts of the country, mainly in the southern states.

E. C. Macy has been appointed engineer of the Stone & Webster division of construction and engineering, with headquarters in Seattle, Wash., succeeding W. L. Locke. Mr. Macy has for many years been connected with the construction forces of the Stone & Webster organization. He had charge of the construction of the Seattle-Everett interurban road and the Bellingham-Mount Vernon line of the Pacific Northwest Traction Company. Mr. Macy was also associated with Chief Engineer S. L. Shuffleton in the construction of the large steam generating plant at Buffalo, N. Y., carried out by the Stone & Webster Engineering Corporation.

Sir Albert H. Stanley, who resigned last December as managing director of the London Underground Electric Railways, London United Tramways, Ltd., Metropolitan District Railway and the London General Omnibus Company, London, Eng., to accept the appointment as minister of commerce and president of the Board of Trade in the British Cabinet, was the subject of a recent communication to the Philadelphia *Public Ledger*. Many instances in the life of Sir Albert are quoted to portray his career in public service work in America before he went to England. The article states that in his opinion English industries and public utilities have profited much from American methods and that they receive more co-operation from the British public than do American industries from our mixed population. It is said that Sir Albert's American business experience and his everlasting ambition to "get on top" were determining factors in his appointment to a place in the Cabinet.

J. T. Hutchings, who has been general manager of the Rochester Railway & Light Company, Rochester, N. Y., since 1909, has, in addition to his present position, been elected vice-president of the company. During his connection with the company he has been instrumental in building up the property to its present prominent position and has greatly improved the company organization. Mr. Hutchings is a graduate of the Massachusetts Agricultural College at Amherst. For a short period after his graduation he was engaged in construction work for the Thomson-Houston Electric Company and later became assistant superintendent of the Germantown Electric Light Company. In 1891 he accepted a similar position with the West End Electric Company of Philadelphia and later was appointed superintendent. When this company was consolidated with others in 1897 as the Philadelphia Electric Company Mr. Hutchings was appointed electrical engineer and continued in that position until 1904, when he became connected with the Rochester Railway & Light Company as superintendent of the electrical department. Two years later he was appointed assistant manager and in 1909 general manager.

J. B. Potter, who has been manager of the New York & Stamford Railway, Port Chester, N. Y., for the last ten years, has resigned, effective July 1, to accept a position with Sanderson & Porter, engineers, New York. Mr. Potter was with that firm from 1898 to 1900 in the capacity of constructing engineer in charge of the construction of an electric railway from Central Village, Conn., to Webster, Mass. His first work in the railway field was with the Westinghouse Electric & Manufacturing Company in the year 1897. In 1900 Mr. Potter was appointed manager and treasurer of the Webster & Dudley Street Railway and after two years in this capacity he was made, in addition, manager of the Worcester & Webster Street Railway properties. These remained under his management until September, 1903, when the two companies were leased to the Worcester & Connecticut Eastern Railway and Mr. Potter was made general superintendent. This company was afterward known as the Consolidated Railway, Putnam Lines. He was appointed general superintendent of the Worcester & Southbridge Street Railway Company in addition to his duties as general superintendent of the Putnam Lines of the Consolidated Railway in the year 1905 and held that position until his appointment as manager of the New York & Stamford Street Railway and the Stamford Lines of the Consolidated Railway in 1907. In his new position Mr. Potter will have charge of the operation of the public utilities in which Sanderson & Porter are interested.

Wilbur C. Fisk, president and general manager of the Hudson & Manhattan Railroad, New York, was honored on June 27 by election to the presidency of the New York Electric Railway Association to succeed James P. Barnes. He has just completed a term as vice-president of the association, and this, together with active committee work, has prepared him adequately for the greater responsibilities as president. Mr. Fisk is a native of New York, having been born in New York City on Feb. 22, 1868. He was graduated from Princeton University in 1890 with the degree of civil engineer and afterward entered the banking house of Harvey Fisk & Sons, New York, founded by his father, Harvey Fisk. He became a member of the firm in 1898. Soon after Harvey Fisk & Sons undertook the financing of the Hudson & Manhattan Railroad at the request of the directors and William G. McAdoo, then president, Mr. Fisk was elected vice-president of the company. In 1908 he assumed also the duties of general manager and had entire control of the operation of the road. When Mr. McAdoo became Secretary of the Treasury under President Wilson Mr. Fisk was elected president of the Hudson & Manhattan to succeed him.

W. C. FISK

B. W. Arnold, as noted last week, is the new manager of the Eastern Wisconsin Electric Company, which consists of the railway property in Oshkosh and the interurban lines in Neenah, Omro and Fond du Lac, including the Fond du Lac city line. Mr. Arnold began railroad work in 1899 with the Wheeling & Lake Erie Railway, and later entered the employ of the Lake Shore Electric Railway, Cleveland, Ohio, as train dispatcher. He resigned in 1902 to become chief dispatcher of the Muncie, Hartford & Fort Wayne Railway, Muncie, Ind., and continued in that position until 1907, when he entered the service of the Illinois Traction System, McKinley Lines, as superintendent of the southern division. Mr. Arnold continued in that capacity for a time, with headquarters at Springfield, and was later transferred to Decatur as superintendent of the Decatur division in charge of all lines running into that city. He was next made chief clerk to the general superintendent of the system, and in 1910 was appointed superintendent of transportation of the Chicago, Ottawa & Peoria Railway, the northern division of the Illinois Traction System, which position he has held until the present time.

B. W. ARNOLD

E. R. Kelsey, advertising manager of the Toledo Railways & Light Company, Toledo, Ohio, one of the H. L. Doherty properties, returned recently from points in North Carolina, Georgia, Oklahoma and Missouri where he visited other companies of the Doherty organization. Mr. Kelsey has collected information for a series of service talks which he intends to prepare.

Obituary

John Lane, formerly superintendent of the Boston & Northern Street Railway, now known as the Bay State Street Railway, Boston, Mass., died recently at his home in Providence, R. I.

Edward E. Higgins, from 1893 to 1900 co-editor of the STREET RAILWAY JOURNAL, died on June 22, at Clinton, Conn. He had been seriously ill for about two weeks. Mr. Higgins was born in Chelsea, Mass., in 1864 and was graduated from the Massachusetts Institute of Technology in its electrical engineering department in 1886. His first connection with the electrical industry was as assistant electrician of the Standard Electric Company of Vermont. In 1888 he joined the sales staff of the Sprague Electric Railway & Motor Company and continued with its successor, the Edison General Electric Company, until 1891, when he accepted the management of the Short Electric Railway Company. This company, a few years before, had been incorporated by Sidney H. Short to build and install electric railways. After the sale of this company to the Westinghouse Electric & Manufacturing Company, about a year later, Mr. Higgins traveled extensively abroad, and on his return to the United States he opened an office in New York as street railway and financial counsel. This led to the contribution of a series of articles to the STREET RAILWAY JOURNAL on street railway investments. These articles were afterward republished in book form, and Mr. Higgins was invited to become one of the editors of the paper. During this connection he specialized on the financial side of electric railway operation, and in 1894 largely due to his initiative, the *Street Railway Red Book,* later known as the *McGraw Electric Railway Manual,* made its appearance as an annual publication. He retired from the STREET RAILWAY JOURNAL in 1900, following the purchase by him and others of the controlling interest in the magazine *Success.* Recently Mr. Higgins has been vice-president and treasurer of the Moore-Cottrell Subscription Agencies.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Columbus, Delaware & Marion Electric Company, Columbus, Ohio.**—Incorporated to take over the Columbus, Delaware & Marion Railway, recently sold under foreclosure to Ralph Beaton, Columbus. Capital stock, $1,000, to be increased to a much larger amount. Incorporators: Samuel L. Finn, Daniel Blau, I. Webb, Ira Cranford and M. F. Sheeler.

FRANCHISES

Syracuse, N. Y.—The New York State Railways has applied to the Public Service Commission for the Second District of New York for its approval of franchises for a number of minor improvements in its track systems in Syracuse to facilitate the operation of the new single-end cars.

Tonawanda, N. Y.—The Public Service Commission for the Second District of New York has approved the extension by the International Railway of its Grand Island Ferry line along the River Road to the Wickwire Steel Company's plant.

Dayton, Ohio.—The Peoples Railway has asked the City Commission for permission to extend its line on the Covington Pike to a point beyond Fairview. The cars are now being operated to the point to which it is desired to extend the line through an arrangement with the Dayton, Covington & Piqua Traction Company.

East Cleveland, Ohio.—The City Council of East Cleveland has approved a twenty-five year franchise to the Cleveland Railway in East Cleveland. The franchise will be submitted to a referendum vote on July 1. The company is to pave its portion of the streets, extend the Superior Avenue line to Euclid Avenue and build a crosstown line on a location yet to be fixed.

Pomeroy, Ohio.—The Ohio River Electric Railway & Power Company has asked the City Council for a new twenty-five year franchise in Pomeroy.

TRACK AND ROADWAY

Municipal Railways of San Francisco, San Francisco, Cal.—Bids were recently opened by the Board of Public Works for the construction of the Municipal Railway line through Twin Peaks tunnel and out to the junction of Junipero Serra and Sloat Boulevards, the lowest bidder being Eaton & Smith, San Francisco, at $80,467.

Delaware & Maryland Traction, Light & Power Securities Company, Wilmington, Del.—This company has secured the franchises of the Fox Creek Railroad Company, of Dorchester County, and the Peninsula Traction Company, of Talbot County, and proposes to construct an electric line to connect Cambridge with Bishop's Head, on the Chesapeake Bay, and a line connecting the principal points on the Eastern Shore with Elkton. The line is expected to pass through Chestertown, Centreville, Church Hill, Denton, Easton, Hurlock and East New Market. The Fox Creek Railroad Company secured a charter about twenty years ago and a bond issue of $90,000 was voted by the county to purchase stock in the road, but it has never been built. It is said that the company also proposes to construct a line from Wilmington to Salisbury, with a branch line from Bridgeville to Williamsburg, and thence to Easton. Lindes & Company, Philadelphia, are interested. [June 23, '17.]

Seaboard Air Line Railway, Savannah, Ga.—This company has inaugurated a gas-electric train service between Savannah and Jacksonville, eliminating the steam service between these two points.

Union Traction Company, Anderson, Ind.—Extensive improvements are being made by the Union Traction Company in its roadway equipment in and around Fort Benjamin

Harrison. The right-of-way between Indianapolis and the fort is being double-tracked between Long's siding to Keystone, near the fair grounds. This will give the company 7 miles of double track between Indianapolis and the fort and will greatly facilitate the handling of cars. Other improvements also are being made to enable the company to better the service and handle a great amount of trains to and from the army post during the training camp period.

Manhattan City & Interurban Railway, Manhattan, Kan.—This company reports that it expects to erect a new steel bridge, possibly using a second-hand deck girder bridge of about 50 to 600 ft. length.

Louisville (Ky.) Railway.—Definite announcement by the Louisville Railway as to its plans for the extension of service to the army camp which will be established in Louisville are being delayed pending the decision of the Fiscal Court of the county on application of the company for a franchise. This is involved also with the matter of final platting of the camp grounds. Meanwhile the company is going ahead with preparations for beginning construction as soon as the route is decided on.

Northern Massachusetts Street Railway, Athol, Mass.—Plans are being considered for an electric freight line to extend from Gardner to Templeton, connecting there with the Boston & Albany Railroad. If these plans go through the Parker Street railroad bridge may have to be altered to a great extent in order to allow freight cars to pass beneath it. It is understood that the problem of fixing the tracks to make them fit for freight service is soon to be turned over to the engineering department.

Mesaba Railway, Virginia, Minn.—This company contemplates replacing its wooden poles with steel poles in Gilbert.

United Railways, St. Louis, Mo.—The Chouteau Avenue viaduct over the Missouri Pacific and Frisco railroad tracks, between Spring and Vandeventer Avenues, has been opened to street car traffic. The viaduct is about 1000 ft. long and cost more than $200,000. It was built by the city, but paid for by the two railroads and the United Railways.

Public Service Railway, Newark, N. J.—This company plans to construct a line on Avenue R from the Lincoln Highway to Port Newark Terminal.

New York & Queens County Railway, New York, N. Y.—The project to construct a line through Peartree and Roosevelt Avenues, Corona, which was to have connected Jackson Avenue with the Alburtis Avenue terminal of the Corona elevated line, has been abandoned by the New York & Queens County Railway as a result of protests by residents of Roosevelt Avenue, who objected to having the line run through their thoroughfare.

Youngstown & Niles Railway, Youngstown, Ohio.—A contract has been awarded by the Youngstown & Niles Railway to J. W. Garland, Inc., Ravenna, for grading the roadbed of its proposed line from Youngstown to Niles. This will be a single track electric line about 6 miles long and will pass through the new town of MacDonald, where the Carnegie Steel Company is erecting a new steel plant and building a new town site for the housing of its workers. The contractor plans to sublet some of this work. [Feb. 10, '17.]

St. Thomas (Ont.) Street Railway.—It is reported that the St. Thomas Street Railway plans the construction of an extension to cost about $40,000.

Toronto (Ont.) Civic Railway.—The City Council of Toronto will call for bids for the construction of the proposed Bloor Street extension.

Klamath Falls (Ore.) Municipal Railway.—The City Council of Klamath Falls has formally accepted the bid and awarded the contract to Robert E. Strahorn, Portland, at $300,000, for the construction of a municipal railway from Klamath Falls to Dairy, 20 miles, and for certain equipment and rolling stock specified. [May 12, '17.]

Rhode Island Company, Providence, R. I.—This company plans to construct double track on Chalkstone Avenue from Smith Street to Lisbon Street.

Austin (Tex.) Street Railway.—Work will soon be begun by the Austin Street Railway on the construction of an extension to Travis Heights. It is expected that the line will be in operation by Aug. 15.

Willapa Electric Company, Raymond, Wash.—The City Council of South Bend has notified the Willapa Electric Company that it must pave between its tracks on Upper Water Street. Three years ago the Council permitted the company to plant between the rails on its plea that the street grade had not settled enough to make it possible to put in paving which would stand wear.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—The extension of a double-track street car line to the site of the American Lake (Wash.) Cantonment near Tacoma, is receiving consideration by officials of the Stone & Webster interests in Tacoma and Seattle. A conference was held recently between W. A. McGrath, vice-president of the Puget Sound Traction, Light & Power Company, and other officials of the company and Major Stone, Capt. H. M. Smitten, chief assistant, and his advisers. The government favors the extension of car service between Tacoma and the new cantonment at the earliest possible date. Tremendous problems of transportation for the thousands who will want to reach Tacoma from the post would be greatly simplified by a street car service. The Pacific Highway, while providing a present good means of connection, will become congested with hundreds of automobile buses and the great number of automobile trucks and delivery machines connected with the business of the post. Traction officials agreed at the conference to take the matter of the extension of its lines under immediate advisement and reach conclusions as soon as possible. Should the company conclude to construct double-track extensions, it will mean the expenditure of several hundred thousand dollars.

Tacoma (Wash.) Municipal Railway.—An ordinance was recently introduced in the City Council authorizing the issuance of $180,000 of city utility bonds to provide funds to build and equip the proposed municipal line to the Todd shipyards on the tideflats. The line may be single or double track. C. D. Atkins, commissioner of public works, is placed in charge of construction.

SHOPS AND BUILDINGS

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.—Plans are being made by the Chicago, North Shore & Milwaukee Railroad for the construction of a new station at Great Lakes.

Kansas City, Mo.—Mayor Edwards of Kansas City has vetoed the ordinance locating the proposed union station for the use of interurban railways at the northeast corner of McGee and Tenth Streets.

Philadelphia, Pa.—Sealed proposals will be received by the Department of City Transit, Philadelphia, Pa., William S. Twining, director, until 12 o'clock noon, on July 10 for the construction of five stations along the line of the Frankford elevated railway. Copies of plans and specifications may be obtained upon deposit of $10, to be refunded upon return of plans.

Texas Electric Railway, Dallas, Tex.—This company will erect a $50,000 to $100,000 union interurban express terminal for the Electric Express Company.

POWER HOUSES AND SUBSTATIONS

Pacific Gas & Electric Company, Sacramento, Cal.—An additional power house will be erected by the Pacific Gas & Electric Company about 600 ft. below the Spaulding Dam, where 5000 hp. will be generated under a 173-ft. head of water. The proposed plant will cost about $125,000.

Manhattan City & Interurban Railway, Manhattan, Kan.—This company reports that it expects to purchase a new or second-hand 200 or 300 kw. rotary converter.

Atlantic Coast Electric Railway, Asbury Park, N. J.—A report from this company states that it is installing four Badenhausen water tube boilers of 610 hp. each, in two batteries, one-half of which will be completed about July 15.

Marion Railway, Light & Power Company, Marion, Ohio.—Extensive improvements are being made to the power plant of this company. They include the installation of a Heine steam boiler, large steam turbine, surface condenser, air pump, circulating pump, etc. A new cooling system will replace the old pipe spray system. The cost of the system is estimated at $37,000.

Manufactures and Markets

Discussions of Market and Trade Conditions for the Manufacturer, Salesman and Purchasing Agent

Rolling Stock Purchases Market Quotations Business Announcements

Settling for Defective Equipment

Neither Party Should Suffer Unduly—Unreasonable Requests Stifle Development—A 50-50 Case Is Cited—Consequential Damages Paid

Manufacturing companies are very jealous of their reputations in the fields which they serve, and for that reason examples are rare of their failure to make good any and all requirements of recognized specifications. But once in a while it falls to the operating engineer to put in a claim against a manufacturer on account of the failure, for a time at least, of certain equipment to give satisfactory service. No general rule can be laid down as to the proper procedure in such cases, for the terms of the contract naturally govern the negotiations in a broad sense. On some occasions it has been found necessary to remove the equipment before acceptance was possible, and in this event the main point is to see to it that the purchaser does not suffer unduly for the trial. Yet the railway company naturally wishes to be entirely fair to the manufacturer, particularly if he puts forth strong efforts to remedy the defects encountered in service.

Most every engineer appreciates the amount of money and effort that the manufacturers of electrical and steam machinery have at times been called upon to spend to make good on guaranteed performances. Certainly the spirit of the manufacturers to fulfill contracts is well known, yet one hears frequently of cases in which the evidence would seem to indicate that some customers have attempted to saddle on to the manufacturers charges that should have been classed as maintenance expense. Not infrequently the manufacturers are asked to make good damaged apparatus that has been in service for a year or more longer than the guarantee period. Sometimes they do it, then charge it to good policy, to competition, or to the sales expense of the next order.

Adjusting Differences Between Manufacturer and Purchaser

The adjustment of differences arising from the interpretation of specifications is always a difficult task and sometimes requires an arbitrator. The time to avoid these differences is, of course, when the contract and specifications are being drawn. At that time the policy of the seller should be definitely expressed regarding the possible payment of damages for loss to the purchaser occasioned by failure of the manufacturer to make delivery on time or the failure of the apparatus to show on test the degree of efficiency called for in the contract.

Since the producers have been so busy lately, it is noted that more companies than heretofore refuse to accept liability for consequential damages, particularly where these are in the form of damages for delayed deliveries.

In discussing this subject of the adjustments effected between buyers and sellers, it should be remembered that upon the spirit of fairness displayed by the buyers will largely depend the willingness of the manufacturer to continue to spend great sums for the development of new apparatus. Still another element to be considered is the fact that the manufacturers have been asked by railway executives to make good so-called defective apparatus which has been damaged through carelessness of the operating staff. And, too, the purchase of standardized products places upon the manufacturer a greater responsibility for making good all defects than would seem to rest upon him when the purchaser has insisted on changes being introduced into the design.

All of these elements are generally recognized, but the citation of one case may be informative. In this instance many months elapsed before a generating unit could be utilized satisfactorily in regular service; so the purchaser's engineer estimated the increased fuel consumption for the period in which the company was obliged to use machines of lower efficiency, and a compromise was made on a "50-50" basis. This brought the owner of the unit nearly $20,000. There was no doubt that the purchaser burned the extra coal, and of course the work of his staff was somewhat increased by the tests and experiments necessary to put the unit in first-class condition. Probably the payroll was not increased seriously, and the compromise solution doubtless was fair to both parties.

Where such estimates are prepared to show the cost to the purchaser of being deprived of a given service for a considerable period, it is desirable that the computations be preserved in a form which will permit easy checking by an arbitrator. The rule of reason should not be forsaken in cases involving the installation of equipment with which the maker, in good faith, is endeavoring to live up to specifications; and petty claims for inconvenience or trifling losses are not worth their trouble. There is a middle ground between sharp practice and easy-going tolerance of real and substantial losses, which can be traversed in most cases with mutual respect and satisfactory relations between the parties concerned.

Fare Register Production Cost Increases

Comparisons Are Made Showing Changes Since Last Year—Wage Scale Shows 40 Per Cent Increase in Three Years

Some of the difficulties with which the manufacturer of fare registers has had to contend during the last three years were set forth in an interview with John F. Ohmer, president of the Ohmer Fare Register Company, Dayton, Ohio, and published in this department of the ELECTRIC RAILWAY JOURNAL for Dec. 9, 1916. At that time it was noted how the abnormally high material prices had enforced conditions upon the manufacturers which had been hard to meet. Attention was called to the increasing difficulties of the paper supply situation, and some interesting facts were given regarding the purchase and preparation of paper rolls suitable for use in recording fare registers.

Mr. Ohmer states that since his earlier interview there have been notable changes in the prices of many of the essentials in fare register manufacture. Some of these are of particular interest. For example, by comparison with the conditions of last October, manufacturing steel has advanced about 15 per cent, brass and aluminum have remained normal, gray-iron castings have advanced 10 per cent, high-speed tool steel has decreased about 20 per cent, and general supplies have advanced an average of from 15 to 20 per cent, while register paper, a most important item, has advanced 48 per cent. The high price of fuel has been sustained, and the indications are that the price will go still higher.

Wages Still Skyrocketing

Because of the proportionately large number of expert mechanics required, the labor cost for fare register manufacture is relatively high, and the great increases of the last few years have brought about conditions heretofore never contemplated. With regard to present wages and the possible future conditions, Mr. Ohmer may be quoted as follows: "A careful analysis of our records shows that our average wage scale in December, 1916, had increased 22.4 per cent over the average wage scale of 1914. Our wage schedule for May, 1917, shows an average increase

for 312 men of 14.6 per cent over the month of December, 1916, and, as compared with the month of May, 1914, our wage schedule for May, 1917, shows an increase of more than 40 per cent. A large majority of our employees are high-grade machinists and tool makers, and our average is perhaps above the general average.

"Since the declaration of war against Germany, followed by uncertainties as to the result of pending legislation which may seriously affect material and labor, there seems to be a tendency to economize along many lines of industry, and until the large appropriations made by our government begin to circulate freely in payment for materials and equipment, we must expect some considerable depression in business."

Standardizing Trade Literature

In connection with the standardization of trade literature, on which a number of articles and comments have appeared recently in these columns, a committee appointed by the Associated Manufacturers of Electrical Supplies has recommended that the dimensions 8 in. x 10½ in. be adopted as standard for catalogs, letter paper, contract forms, bulletins, specifications and engineering forms for the following reasons:

A large portion of the manufacturers would be glad to adopt any standard dimensions recommended by the committee.

The 8-in. x 10½-in. sheet has approximately 10 per cent less paper than the 8½-in. x 11-in. One manufacturer estimates that this item alone will save his company $12,000 a year, and all manufacturers are vitally interested in a saving of this nature.

Our investigations indicate that these dimensions have been adopted as the United States government standard.

As a rule photographs of electrical apparatus are made on 8-in. x 10-in. plates and the finished prints can be easily trimmed to 8-in. x 10½-in.

The American Institute of Architects has recommended the size of 8 in. x 10½ in. for all catalogs of building material. A thin catalog of this size when folded once will fit readily the average pocket, whereas a 6-in. x 9-in. catalog when not folded will not fit in the pocket.

The Electrical Supply Jobbers' Association has adopted as the standard for its loose-leaf catalog a page 8 in. x 10½ in.

This size of sheet for letter paper, catalogs, etc., will file much more readily in standard letter files than will the larger size.

In addition to the actual saving in paper mentioned, there would be an additional saving in envelops and a very great saving in postage, due to reduced shipping weight of catalogs. The question of postage will probably become a very serious matter of expense to the manufacturer in the near future and should receive careful consideration.

Increase in Coal and Coke Shipments for May

The number of carloads of bituminous coal originating on eighty-two railroads during the month of May, 1917, as compiled from a report received by the Geological Survey, Department of the Interior, was 739,674 as compared with 657,809 in April of 1917 and with 597,517 for May of 1916. Shipments originating on eleven roads in central Pennsylvania, Maryland and the New River and Pocahontas fields of West Virginia and Virginia amounted to 186,249 carloads, which was the largest amount from any of the seven districts included in the report. The increase in the shipments of bituminous coal in May, 1917, compared with April, 1917, was 12.4 per cent, and compared with May, 1916, it was 23.8 per cent. The daily average of cars loaded in May, 1917, was 28,429 as compared with 26,312 in April, 1917, and 22,981 in May, 1916.

Carloads of beehive coke originating on sixteen roads during the month of May, 1917, amounted to 75,528 as compared with 72,222 for April, 1917, and 76,096 for May, 1916. The May shipments of 1916 showed an increase of 4.6 per cent over April, 1917, and a decrease of 0.75 per cent as compared with May, 1916.

War Demand for Lumber Will Not Disturb Market

Enormous Amount Needed for Army Purposes Is Only Small Per Cent of Annual Production

The lumber committee of the advisory commission, Council of National Defense, has estimated that 2,000,000,000 ft. of lumber will be used in the next twelve months for purposes directly connected with the war. While this is a colossal order and will bring added prosperity to the lumber industry, it should give no apprehension that it will disturb the markets or cause any shortage of lumber. Large as this amount is, it will not exceed 5 per cent of one year's lumber production in the United States.

The committee representing the Southern Pine Association recently announced that Gen. George W. Goethals had placed an order for lumber for 100 ships, to be sawed by the Southern mills at an average price of $35 per thousand feet at the mills. Approximately 140,000,000 ft. of lumber will be required for these 100 ships.

New Westinghouse Vice-Presidents

As noted briefly in last week's issue, H. D. Shute, H. T. Herr and Walter Cary have been elected vice-presidents of the Westinghouse Electric & Manufacturing Company. Mr. Shute was graduated from Massachusetts Institute of Technology with the class of 1892. He became associated with the Westinghouse company the following year, and after spending two years in the testing department became associated with L. B. Stillwell. After some time spent on construction and design work he entered the sales department, in which he remained until 1903, when he was made assistant to Vice-President L. A. Osborne. He filled this position for about seven years, when he was elected acting vice-president. In 1914 he was made treasurer of the company, succeeding T. W. Siemon.

Herbert Thacker Herr has been connected with the Westinghouse Machine Company since 1908, holding respectively the positions of general manager, second vice-president and finally vice-president and general manager. He received his education in the public schools in Denver and at Yale University. After leaving college he became identified with a number of railroads, serving in various capacities, and in 1906 was made general superintendent of the Denver & Rio Grande Railroad. Two years later he became vice-president and general manager of the Duquesne Mining & Reduction Company, which position he held until he moved to Pittsburgh.

Walter Cary has, since 1904, been associated with the Westinghouse Lamp Company, filling for the greater part of the time the position of vice-president and general manager. He received his education in the city schools of Milwaukee and at Harvard University. Later he became secretary of the Gibbs Electric Company of Milwaukee, and in 1899 with other local men formed the Milwaukee Electric Company, becoming its vice-president and, in 1902, president.

Railroads' War Board Helps to Reduce Car Shortage

The shortage of freight cars in the United States was reduced during the month of May from 148,627 to 105,127 cars, almost 33⅓ per cent. This marked reduction in one month, following four months of rapid increase, is attributed to the prompt response on the part of both shippers and railroads to the specific suggestions which have been made by the railroads' war board as to how to secure more effective uses of existing freight equipment. Some of those suggestions are: Load cars 10 per cent in excess of marked capacity; reduce percentage of cars and locomotives under repairs; improve methods of firing locomotives; defer scrapping light locomotives; speed up handling of cars in terminals by prompt despatch of trains; load and unload promptly, and enlist co-operation of shippers, as a war measure, to secure heavier loading of cars.

The progressive improvement in the situation is indicated by the fact that on March 1 reports made by railroads to the American Railway Association showed a shortage in the entire country of 130,082 freight cars. The shortage grew to 144,797 by April 1, and on May 1, when the railroads' war board was just starting to operate all the railroads as a continental system with the aim of producing a maximum national transportation efficiency, the shortage had reached 148,627 freight cars.

NEW YORK METAL MARKET PRICES

	June 16	June 28
Prime Lake, cents per lb.	32½	32½
Electrolytic, cents per lb.	32½	32½
Copper wire base, cents per lb.	36	36
Lead, cents per lb.	11⅞	11¾
Nickel, cents per lb.	50	50
Spelter, cents per lb.	9¾	9⅞
Tin, Straits, cents per lb.	60⅝	62
Aluminum, 98 to 99 per cent, cents per lb.	61	61

OLD METAL PRICES

	June 16	June 28
Heavy copper, cents per lb.	28	28½
Light copper, cents per lb.	25½	25½
Red brass, cents per lb.	17½	17½
Yellow brass, cents per lb.	18	18
Lead, heavy, cents per lb.	8¾	8¾
Zinc, cents per lb.	7	7¼
Steel car axles, Chicago, per net ton	$48.00	$53.00
Old car wheels, Chicago, per gross ton	$36.00	$43.00
Steel rail (scrap), Chicago, per gross ton	$39.50	$48.50
Steel rail (relaying), Chicago, per gross ton	$42.50	$53.50
Machine shop turnings, Chicago, per net ton	$18.00	$20.00

CURRENT PRICES FOR MATERIALS

	June 16	June 28
Rubber-covered wire base, New York, cents per lb.	36½	36½
No. 0000 feeder cable (bare), New York, cents per lb.	36½	36½
No. 0000 feeder cable stranded, New York, cents per lb.	33¾	33¾
No. 6 copper wire (insulated), New York, cents per lb.	33	33
No. 6 copper wire (bare), New York, cents per lb.	36	36
Rails, heavy, O. H., Pittsburgh, per gross ton	$40.00	$40.00
Wire nails, Pittsburgh, per 100 lb.	$3.50	$3.20
Railroad spikes, 9/16 in., Pittsburgh, per 100 lb.	$4.00	$4.50
Steel bars, Pittsburgh, per 100 lb.	$4.40	$4.50
Sheet iron, black (24 gage), Pittsburgh, per 100 lb.	$7.35	$7.90
Sheet iron, galvanized (24 gage), Pittsburgh, per 100 lb.	$9.05	$9.30
I-beams over 15 in., Pittsburgh, cents per lb.	10	10
Galvanized barbed wire, Pittsburgh, cents per lb.	$4.35	$4.85
Galvanized wire, ordinary, Pittsburgh, cents per lb.	$4.15	$4.85
Cement (carload lots), New York, per bbl.	$2.40	$2.40
Cement (carload lots), Chicago, per bbl.	$2.31	$2.31
Cement (carload lots), Seattle, per bbl.	$2.60	$2.60
Linseed oil (raw, 5 bbl. lots), New York, per gal.	$1.21	$1.18
Linseed oil (boiled, 5 bbl. lots), New York, per gal.	$1.22	$1.19
White lead (100 lb. keg), New York, cents per lb.	12¼	12¾
Turpentine (bbl. lots), New York, cents per gal.	44	43

ROLLING STOCK

Mason City & Clear Lake Railroad, Mason City, Ia., has purchased five one-man safety cars.

Kankakee & Urbana Traction Company, Kankakee, Ill., is in the market for a standard trail car.

Birmingham Railway, Light & Power Company, Birmingham, Ala., noted in the May 5 issue as purchasing twelve double-end, closed motor cars through the United Gas & Electric Corporation, has specified the following details for this equipment:

Number of cars ordered	12
Date of order	April 27, 1917
Date of delivery	Oct. 1, 1917
Builder	J. G. Brill
Type	Closed motor
Over bumpers	47 ft. 8 in.
Over corner posts	34 ft. 8 in.
Over all	8 ft. 7 in.
Rail to trolley base	11 ft. 1 in.
Body	Semi-steel
Interior trim	Cherry
Headlining	¼-in. Nevasplit
Roof	Arch
Air brakes	Westinghouse
Axles	Hammered steel
Bumpers	Rico anti-climbers
Car trimmings	Bronze
Control	Westinghouse
Curtain fixtures	Forsythe No. 88
Curtain material	Pantasote No. 86
Designation signs	Keystone, Ill.
Door mechanism	Burdette Rowntree
Fenders	H. B. lifeguards
Gongs	12-in. Brill Dedenda
Heaters	Consolidated Car Heating
Headlights	Crouse-Hinds
Journal boxes	Brill
Lightning arresters	not placed
Motors	Four West. 506-A-2
Registers	International
Sanders	not placed
Sash fixtures	O. M. Edwards
Seats	Hale & Kilburn No. 300-A
Seating material	Cherry wood
Step treads	Amer. Abrasive Co.
Trolley catchers	Earle No. 7
Trucks	Brill 77-E-1
Ventilators	Railway Utility Co.
Wheels	So. W. Co. 26-in. cast iron
Special devices	Consolidated buzzer system, Ellcon stanchions, Railway Utility thermostats, Brill center and side bearings, Brill graduated spring system and Brill bolster guide arrangement.

Manhattan City & Interurban Railway, Manhattan, Kan., is in the market for several large double-truck double-end motor cars and several large trailers.

Knoxville Railway & Light Company, Knoxville, Tenn., noted in the May 5 issue as having had twelve double-end closed motor cars purchased for it through the United Gas & Electric Corporation, has specified the following details for these cars:

Number of cars ordered	12
Date of order	April 27, 1917
Date of delivery	Oct. 1, 1917
Builder	J. G. Brill
Type	Closed motor
Seating capacity	52
Over bumpers	47 ft. 8 in.
Over corner posts	34 ft. 8 in.
Over all	8 ft. 7 in.
Rail to trolley base	11 ft. 1 in.
Body	Semi-steel
Interior trim	Cherry
Headlining	¼ in. Nevasplit
Roof	Arch
Air brakes	West.
Axles	Hammered steel
Bumpers	Rico anti-climbers
Car trimmings	Bronze
Control	West.
Curtain fixtures	Forsythe No. 88
Curtain material	Pantasote No. 86
Designation signs	Keystone, Ill.
Door mechanism	Burdette Rowntree
Wheelguards	H. B. lifeguards
Gongs	12 in. Brill Dedenda
Heaters	Consolidated Car Heating
Headlights	Crouse-Hinds
Journal boxes	Brill
Lightning arresters	not placed
Motors	Four West. 506-A-2
Registers	International
Sanders	not placed
Sash fixtures	O. M. Edwards
Seats	Hale & Kilburn No. 300-A
Seating material	Cherry wood
Step treads	Amer. Abrasive Co.
Trolley catchers	Earle No. 7
Trucks	Brill 77-E-1
Ventilators	Railway Utility Co.
Wheels	So. W. Co. 26-in. cast iron
Special devices	Consolidated buzzer system, Ellcon stanchions, Railway Utility thermostats, Brill center and side bearings, Brill graduated spring system and Brill bolster guade arrangement.

Northern Ohio Traction & Light Company, Akron, Ohio, has specified the following details for ten 33-ft. vestibuled single-end pay-within cars and for ten center-entrance trailers being built for it by the St. Louis Car Company.

	Single-End Pay-Within Cars	Center-Entrance Trailers
Number	10	10
Name	N. O. T. & L.	N. O. T. & L.
Builder	St. Louis Car	St. Louis Car.
Type	Single-end	Center entrance.
Seating capacity	48	66.
Weight (total)	43,000 lb.	25,000 lb.
Truck centers, length	19 ft. 6 in.	28 ft. 0 in.
Length over bumpers	46 ft. 4 in.	46 ft. 8¾ in.
Length over corner-posts	33 ft. 0 in.	
Length over vestibule	45 ft. 4 in.	
Width over posts	8 ft. 5½ in.	8 ft. 2 in.
Sill to trolley base	8 ft. 5½ in.	8 ft. 11⅝ in.
Floor to ceiling	7 ft. 6 in.	
Body	Steel	Steel underframe.
Interior trim	Solid mahogany	Solid mahogany.
Head lining	3/16 in. agasote	3/16 in. agasote.
Roof	Turtle deck	Monitor.
Air brakes	Westinghouse	Westinghouse.
Axles		Forged open hearth.
Bumpers	Rico anti-climbers	Rico anti-climbers.
Car trimmings	Bronze	Bronze.
Conduits and junction boxes	St. Louis Car	St. Louis Car.
Control, type	GE. K-34	
Couplers	Tomlinson	Tomlinson.
Curtain fixtures	Forsyth No. 88	Forsyth No. 88.
Curtain material	Pantasote N-3	Pantasote.
Designation signs	Ill.—St. Louis Car	E. S. S. Co.
Door mechanism	Hand operated	Natl. Pneumatic.
Hand brakes	Ry. company's design.	Ackley.
Heaters	Peter Smith No. 2-P.	Peter Smith No. 2-P.
Headlights	Crouse-Hinds.	
Hand straps	Rico sanitary	
Journal boxes		St. Louis Car.
Motors	Four GE. 203 outside hung	
Paint	Murphy ABC	Murphy ABC.
Registers	International R-S.	
Sand box with Reliance	Sand trap valve	
Sash fixtures	O. M. Edwards	O. M. Edwards.
Seats	Hale & Kilburn	Hale & Kilburn.
Seating material	Rattan	Rattan
Springs	Pittsburgh Steel Spring Co.	Pittsburgh Steel Spring.
Step treads	Mason safety tread	Mason.
Trucks	Standard 0-50-0	St. Louis Car 118
Ventilators	Automatic	Deck Sash.
Wheels	33 in. Cast Iron	Cast iron 22 in. diam.
Special devices, etc.	Faraday buzzers, Perry side bearings, Ohio Brass Signals.	Faraday buzzers, Perry side bearings, rear end signals, Ohio Brass.

TRADE NOTES

Carbo Steel Post Company, Chicago, Ill., has moved its offices to 4-5 Transportation Building.

Hess-Bright Manufacturing Company, Philadelphia, Pa.: A bulletin on "Hess-Bright Ball Bearings," and how to apply them.

M. M. Moore, formerly with the machine tool department of Gaston, Williams & Wigmore, Inc., New York, has severed his connection with that firm and is now associated with the sales department of John W. Thorne & Company, Inc., 165 Broadway.

Cooper-Hewitt Electric Company, Philadelphia, Pa., has moved its offices from 124 South Eighth Street to the Drexel Building.

Standard Varnish Works, New York, N. Y., announces that its advertising department is now located at the main office, 90 West Street, New York City, and that in the future all matter pertaining to advertising should be directed to this new address.

Karl W. Bock, who for the last ten years has been secretary of and assistant to the vice-president of the Union Pacific Coal Company, Omaha, Neb., has been appointed manager of the Walter A. Zelnicker Supply Company, St. Louis, Mo.

Templeton-Kenly & Company, Ltd., Chicago, Ill., report that the recently improved flexible-type jack has broadened the jack market in the electric railway industry. Formerly the rigid-base jacks were purchased for use by the track and car-shop departments only. Now, with the development of the flexible-base jack, the line department has found many uses for them, and they are carried on trouble wagons. In consequence the sales to electric railway companies have been on the increase. Templeton-Kenly & Company report, for example, for their special pole-handling jack that large numbers have been sold to the American Telephone & Telegraph Company, that the Commonwealth Edison Company of Chicago has purchased more than 100, and that large shipments have been made to the Australian government telegraph system, to the Danish government telephone system, to practically all the public service properties in Hawaii, to the Connecticut Company and to the Public Service Company of New Jersey. The Illinois Traction System has also recently ordered these jacks for use on its line cars. The quality of materials used in jack manufacture is now high, and therefore the jack of to-day may be expected to do better duty and withstand more severe service than those manufactured some years ago.

NEW ADVERTISING LITERATURE

U. S. Electrical Manufacturing Company, Los Angeles, Cal.: A pamphlet on the Johnson electric grinding and buffing tool for machine shop and all-around general use.

Ohmer Fare Registering Company, Dayton, Ohio: A bulletin, "Getting Your Money," explaining methods of protecting your income and its source by the Ohmer system of fare protection.

Laclede-Christy Clay Products Company, St. Louis, Mo.: A pamphlet "All in the Same Boat." This is an appeal to all users of refractory materials to anticipate their orders six months in advance in order to insure deliveries.

Sprague Electric Works of the General Electric Company, New York, N. Y.: Bulletin 48700A on monorail hoists. Gives descriptions, illustrations and other data on the use of monorail hoists in shops, foundries and manufacturing plants.

Guaranty Trust Company, New York, N. Y.: A bulletin on "The Financing of American Foreign Trade," explanatory of the facilities offered to American and foreign banking institutions and to importers and exporters by the foreign department of the company.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.: Bulletin No. 7193 on "Westinghouse Electrical Equipment for Ventilating Service." Types of motors and controllers adapted for this service are described and the amount of power required to drive different types of fans and blowers is also given.

Chicago Pneumatic Tool Company, Chicago, Ill.: Bulletin 34-Y on "Gas and Gasoline-Driven Air Compressors," descriptive of its class N-SG and N-SGL compressors. Longitudinal sections showing details of the construction and several pages of data on general dimensions for the different sizes of compressors are given.

Delta-Star Electric Company, Chicago, Ill.: Bulletin No. 31. Forty-eight pages on "High-Tension Indoor Universal 'Unit Type' Busbar Supports." Illustrates a number of installations of busbar and wiring supports, I-beam busbar supports, different types and mountings in modern compartments, dimensions of various types of busbar supports, combination switch and fuse, selective switches and unit type outdoor equipment.

Prest-O-Lite Company, Inc., Indianapolis, Ind.: A pamphlet "Prest-O-Lite Process," and apparatus for oxy-acetylene welding and cutting. Gives details of portable welding equipment, also details of parts. Contains useful data on costs, cutting results, oxygen and acetylene consumption per hour for different sizes of tips, etc.

Stroh Steel Hardening Process Company, Pittsburgh, Pa.: An attractive twenty-four-page bulletin on the Stroh process, which consists of casting fine alloy steel and soft steel in one solid piece. This process is used for hardening gears and pinions, mine car wheels, frogs, crossings and inserts, and many types of large castings.

Dunn Wire-Cut Lug Brick Company, Conneaut, Ohio: A thirty-two-page bulletin, "Modern Methods of Brick Pavement Construction," for roads and streets built with wire-cut lug brick. Contains a brief review of the early history and of the evolution of the brick paving industry, a description of this company's standard brick and how it is laid, also its process of manufacture, engineering service rendered, and new paving methods now being employed. It also includes a number of testimonial letters from engineers, contractors and electric railway companies, including the Ohio Electric Railway, the Lake Shore Electric Railway, Buffalo & Lake Erie Traction Company and others.

New Publications

Railway Statistics of the United States of America.—1916. Prepared by Slason Thompson. Bureau of Railway News & Statistics, Chicago, Ill. 148 pages. Paper.

The present issue of this publication, now in its thirteenth year, is for the year ended June 30, 1916. Statistics for steam railroad operation during this period are compared with the official reports for 1915. The pamphlet also contains recent statistics of foreign steam railroads.

Business Finance. By William H. Lough. Ronald Press Company, New York, N. Y. 631 pages. Cloth, $3.

Written from the point of view of the organizer or financial manager of an enterprise, this book deals with the every-day financial problems of the private business concern. Forms of business organization and of security issues, raising capital, handling capital and remedying mismanagement and irregularities—all these are clearly and thoroughly explained. The information given should be of value to him who manages corporate finances or him who criticises their management. Many examples cited in the book are from the utility field, which should amply indicate its applicability to utility finance.

Some Legal Phases of Corporate Financing, Reorganization and Regulation. By Stetson, Byrne, etc. The Macmillan Company, 66 Fifth Avenue, New York, N. Y. 389 pages. Cloth, $2.75.

This book consists of a series of interesting addresses delivered in 1916 before the Bar Association of New York City. Such topics are covered as the preparation of corporate instrument, foreclosure of mortgages, reorganization, federal business laws and public service commissions. While the lectures were intended to aid lawyers who might be engaged in corporate practice in some way, they ought also to be of interest to the utility official who wants to have a general knowledge of corporation finance and law.

Units of Weight and Measure: Definitions and Tables of Equivalents. Bureau of Standards. Technologic Paper No. 47. Government Printing Office, Washington, D. C. Sixty-eight pages. Paper, 15 cents.

This paper is intended to supply the need for various authoritative tables of weights and measures for converting the United States customary units into metric units, and vice versa. It contains sixty-eight pages of definitions and translation tables, and gives official definitions of the units and definite statements as to the spelling and abbreviations of the various units of measurement. Since the use of the metric system in foreign trade is necessary either in catalogs and price lists, in the making up of metric packages, or in working the metric dimensions, the circular will be found especially timely. A copy should be in the hands of every one engaged in foreign trade, scientific or technical work, etc.

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ELECTRIC RAILWAY JOURNAL

H. W. BLAKE, Editor

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The

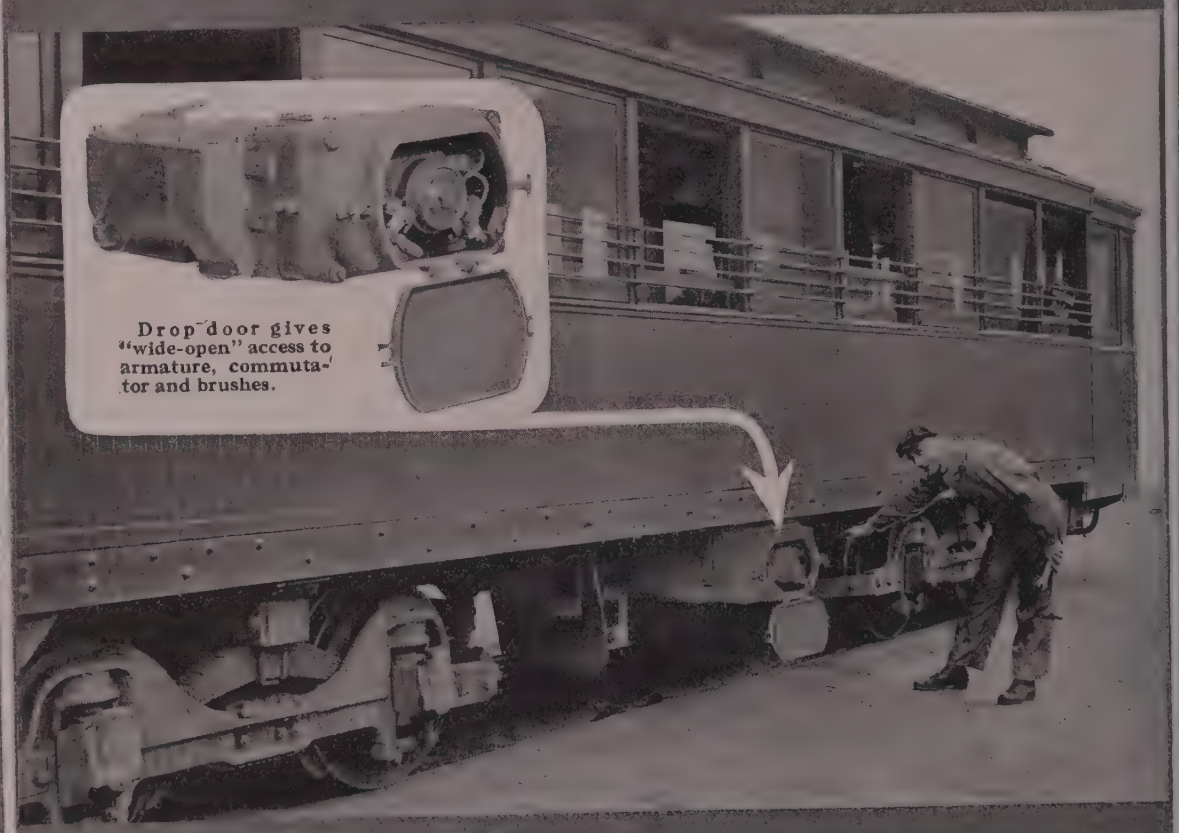
Westinghouse "Bungalow"

compressor is an Air Brake Specialist's product and is adopted as standard on many electric railways, because:

First; best possible design to perform the duty required with efficiency.

Second; best materials, careful workmanship, rigid inspection and test.

Third; maintenance facilities carefully considered and liberally provided.



Westinghouse Traction Brake Company

General Offices and Works: Wilmerding, Pa.

Atlanta, Ga.
Boston, Mass.
Chicago, Ill.
Columbus, O.
Denver, Col.
Houston, Tex.
Los Angeles,
Mexico City
New York, N. Y.
Pittsburgh, Pa.
Seattle, Wash.
San Francisco,
St. Louis, Mo.
St. Paul, Minn.

Westinghouse Underfeed Stoker

This list of Westinghouse Underfeed Stokers installed and on order was prepared to show their wide distribution throughout the United States:

Purchaser	Number of Units	Total Boiler H.P.
Duquesne Light Co., Pittsburgh, Pa.	8	4800
City of Detroit, Michigan	2	1370
Consumers Power Co., St. Paul, Minn.	4	2000
Firestone Tire & Rubber Co., Akron, O.	2	1750
" " (Repeat Order)	2	1750
Norfolk & Western R. R. Co., Bluestone, W. Va.	10	6670
" " (Repeat Order)	2	1334
Public Service Elec. Co., Jersey City, N. J.	5	3000
" " (Repeat Order)	5	3250
Roanoke Railway & Electric Co., Roanoke, Va.	4	2100
" " (Repeat Order)	2	1000
Spang-Chalfant Co., Pittsburgh, Pa.	2	1000
" " (Repeat Order)	1	For Heating Furnace
" " (Repeat Order)	1	" " "
United Gas & Elec. Engr. Corp., New Orleans, La.	1	900
" " (Repeat Order)	2	1800
" " (Repeat Order)	5	4500
U. S. Navy Yards, Brooklyn, N. Y.	12	5120
U. S. Proving Grounds, Indian Head, Md.	8	3812
West Penn Traction Co., Connellsville, Pa.	3	3900
Minneapolis General Elec. Co., (H. M. Byllesby & Co.), Minneapolis, Minn.	12	7200
" " (Repeat Order)	5	6310
Cluett-Peabody & Co., Troy, N. Y.	2	1000
" " (Repeat Order)	2	1000
American Gas & Elec. Co., Windsor, W. Va.	5	6310
" " (Repeat Order)	3	3786
" " (Repeat Order)	4	5048
" " (Repeat Order)	4	5048
Harrison Bros. & Co., Philadelphia, Pa.	5	2500
Western Lt. & Power Co., Lafayette, Colo.	1	411
" " (Repeat Order), Cheyenne, Wyo.	2	911
" " (Repeat Order), Lafayette, Colo.	4	1644
Transit Supply Co., Minneapolis, Minn.	1	550
" " (Repeat Order)	11	6050
Interstate Lt. & Pwr. Co. (H. M. Byllesby & Co.), Galena, Ill.	2	820
" " (Repeat Order)	4	1640
" " (Repeat Order)	2	820
Arkansas Valley Ry., Lt. & Pr. Co. (H. M. Byllesby & Co.), Canon City, Colo.	3	1800
Union Elec. Lt. & Pr. Co., St. Louis, Mo.	10	5580
" " (Repeat Order)	6	3348
Merchants Heat & Lt. Co., Indianapolis, Ind.	8	4000
" " (Repeat Order)	2	2000
Alabama Power Co., Birmingham, Ala.	5	6000
Edison Electric Illum. Co., Boston, Mass.	8	4096
" " (Repeat Order)	6	3348
Union Gas & Elec. Co., Cincinnati, O.	8	10096
Duluth & Iron Range R. R. Co., Two Harbors, Minn.	4	1000
Little Rock Ry. & Elec. Co. (United Gas & Elec. Engr. Corp.), Little Rock, Ark.	2	1200

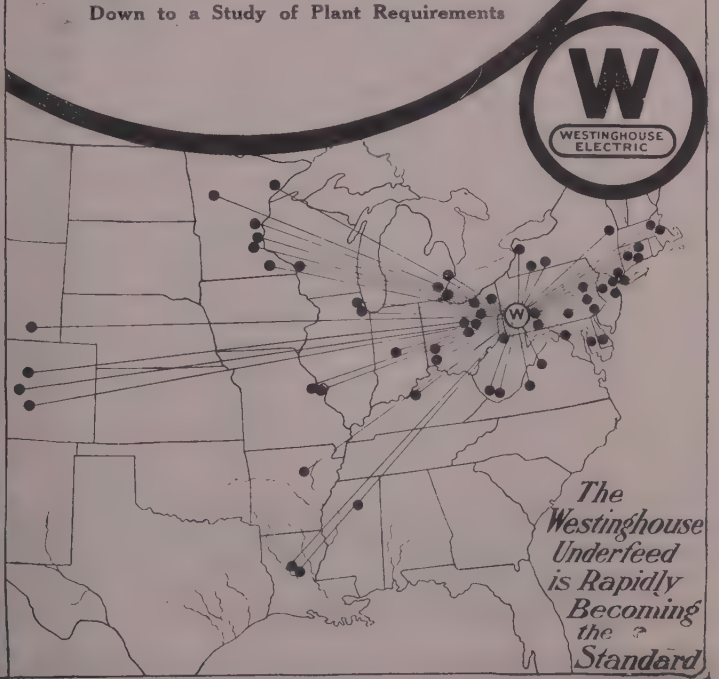
Write for descriptive circular

Wonderful Reserve Power

—NO waste—NO idle equipment —NO banked fires—NO spare boilers to be held in readiness for the daily peaks. For the Westinghouse Underfeed Stoker embodies IN ITS DESIGN a wonderful flexibility—a gigantic overload capacity.

Westinghouse Electric & Manufacturing Co.,
East Pittsburgh, Pa.

The Choice of a Stoker Always Narrows Down to a Study of Plant Requirements



Phono-Electric

—the trolley of long life

At Dead Man's Cut

Thus do the folk along the Norfolk & Western Railway call the cut illustrated because of the toll that it has taken in human lives.

Such an expression leads us to place emphasis on the **Safety** of Phono-Electric as a contact wire.

While the catenary construction of the Norfolk & Western would prevent a broken wire from touching the ground, it would not prevent contact with workers on the coal cars.

The use of Phono-Electric, however, is splendid safety insurance for this condition, because the toughness, homogeneity and non-crystallizing qualities of Phono-Electric assure a wire that will wear uniformly—a wire upon which actual measurements may be depended to indicate the danger point before breaking.

Bridgeport Brass Company
Bridgeport Connecticut

2040

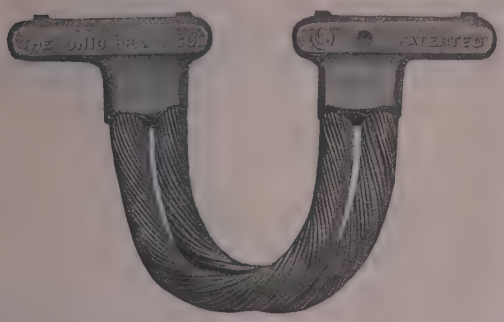
O-B Gas-Weld Rail Bonds

The Pioneer Gas-Weld Bonds with Exclusive Features

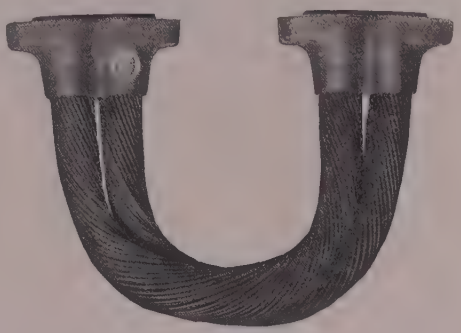
The third year since The O-B Company introduced Gas-Weld Bonding finds the O-B Bonds steadily gaining in popularity. Every buyer is a satisfied user. The frequent repeat orders are evidence of universal satisfaction.

The first purchaser installed over 10,000 bonds after he had investigated the thorough service trials made by the O-B Company. He has since made additional purchases of considerable quantity.

O-B Engineers follow and will continue to follow each installation. They will gladly demonstrate the process on your tracks.

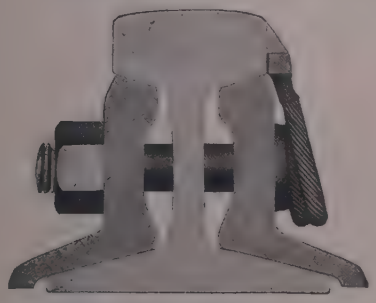


Type G-W Bond—Patented
All Copper



Type ST—Patented
Copper Strand—Steel-protected Terminal

Exclusive Patented Features of O-B Bonds



Section of O-B Bond on
Rail Showing Beveled Terminal

Before installation, the flat top of O-B Bonds forms a right angle with the face of the rail. In this angle the welder, with his work always in plain sight, builds up the beveled terminal which is almost immune to damage by downward blows from street traffic.

Small feet on the bond terminal hold it away from the rail, thus allowing room for the gases to escape and making possible a flawless weld at all points.

Numerous other patents

Our booklet, "Gas-Weld Bonding," tells all the details about this simple process. Write for a copy. The book or a demonstrator will be sent at your request.

The Ohio Brass Co., Mansfield, Ohio

New York Philadelphia Pittsburgh Chicago San Francisco Los Angeles

Western Red Cedar Poles

Used in this Great Electrification Project

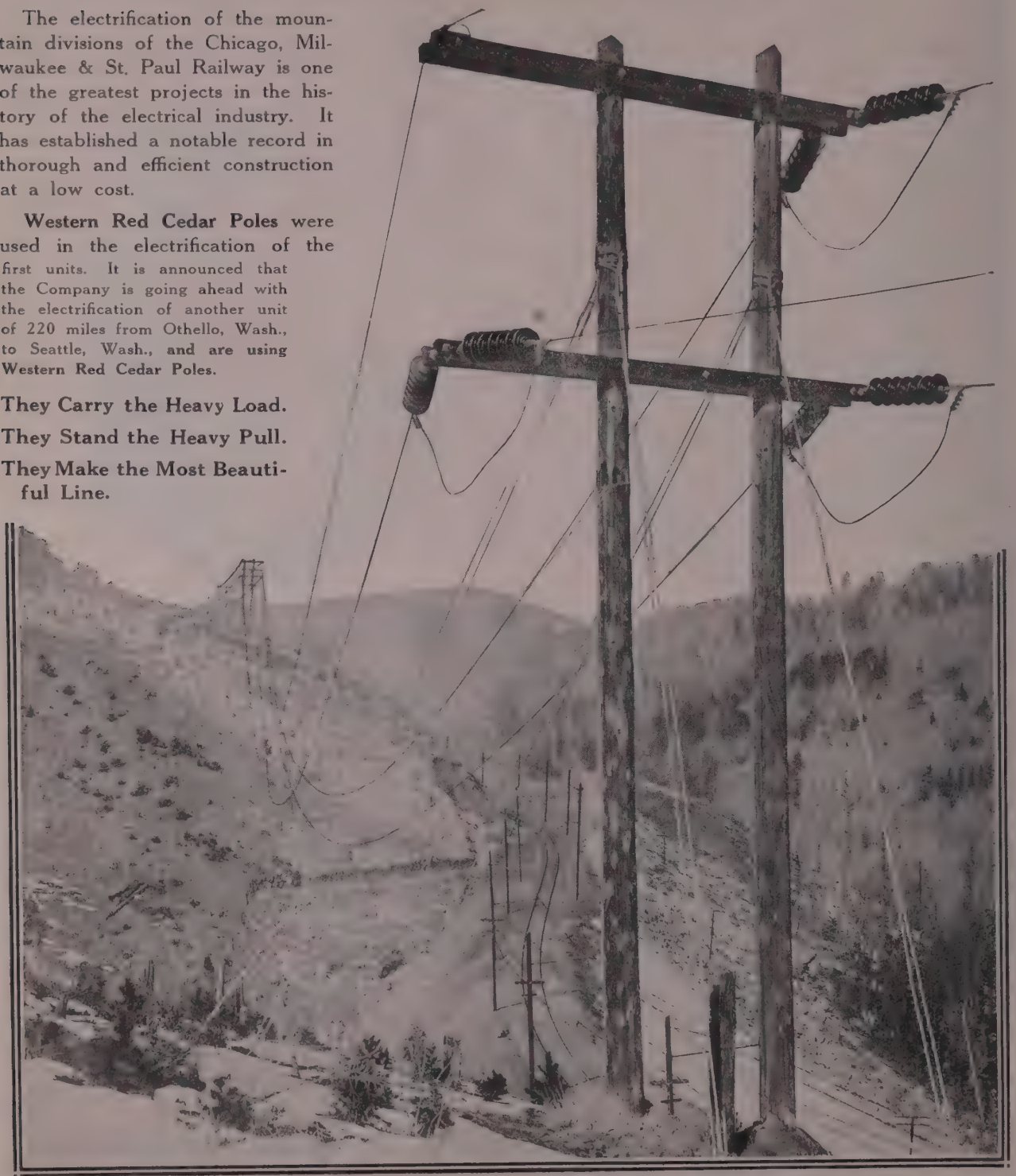
The electrification of the mountain divisions of the Chicago, Milwaukee & St. Paul Railway is one of the greatest projects in the history of the electrical industry. It has established a notable record in thorough and efficient construction at a low cost.

Western Red Cedar Poles were used in the electrification of the first units. It is announced that the Company is going ahead with the electrification of another unit of 220 miles from Othello, Wash., to Seattle, Wash., and are using Western Red Cedar Poles.

They Carry the Heavy Load.

They Stand the Heavy Pull.

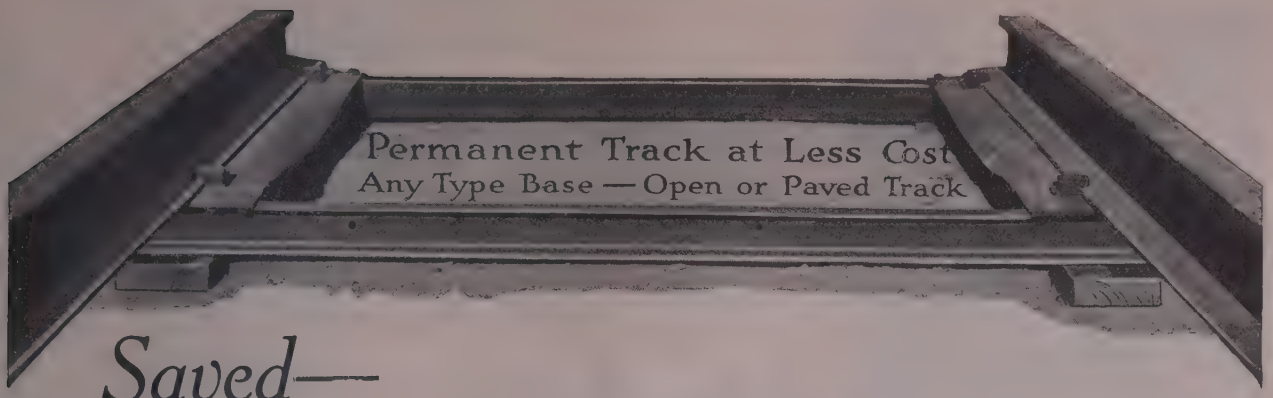
They Make the Most Beautiful Line.



On Chicago, Milwaukee & St. Paul Railway, 20 miles east of Butte, Montana. Weight supported by Pole Structure in foreground, 1335 pounds. Height of Pole above ground, 30 ft.; length of Span, 970 ft.

You are invited to write us for further information.

Western Red Cedar Association, Peyton Building, Spokane, Washington



Saved—

$1000 to $6000 Per Mile of Track

by constructing with

INTERNATIONAL
STEEL TWIN TIES

Here Are the Figures: Comparison of Costs of Standard Wooden Tie and Steel Tie Track Construction from base of Rail to Subgrade.

Estimate Based on Type C. Track Shown
In A. E. R. E. A. Proceedings of 1914—Page 487
(6 in. x 8 in. x 8 ft. Ties in 9 ft. Trench)

5280 sq. yds. granite block paving at $2.25 per sq. yd.	$11,880.00
880 tie rods 2 in. x 5/16 in. x 5 ft. at 50c	440.00
5280 tie plates at 30c	1,584.00
10,560 screw spikes and clips at 11c	1,161.60
Track labor (laying and surfacing)	2,640.00
2640 6 in. x 8 in. oak treated ties at $1.00	2,640.00
1494 cu. yds. of concrete at $5.00	7,470.00
1754 cu. yds. of excavation at $1.15	2,017.10
	$27,232.00*

*If tie plates, screw spikes and clips are omitted and cut spikes are used, deduct $2,601.00 from wooden tie construction estimate.

**In case tie rods are required, add $440.00 to steel tie construction estimate.

Estimate Based on Standard Steel Tie Construction
(International Steel Twin Ties in a 7 ft. Trench)

4110 sq. yds. Granite Block paving at $2.25 per yard	$9,274.50
880 Steel Twin Ties at $6.00 f.o.b. Cleveland	5,280.00
7040 clips and wedges at 7c	492.80
Track labor (laying and surfacing)	1,320.00
789 cu. yds. of concrete 1:3:6 at $5.00	3,945.00
801 cu. yds. of excavation at $1.15	921.15
	$21,216.45**
Total cost wooden ties	$27,232.00
Total cost steel ties	21,216.45
Total saving	$6,015.55

Labor saving shown in Steel Tie Estimate is made possible by the reduction of the number of ties, the simplicity of the fastening, the elimination of track gauging, the reduction in the number of blocks and wedges required to line and surface the track, and in the small quantities of excavation and concrete required.

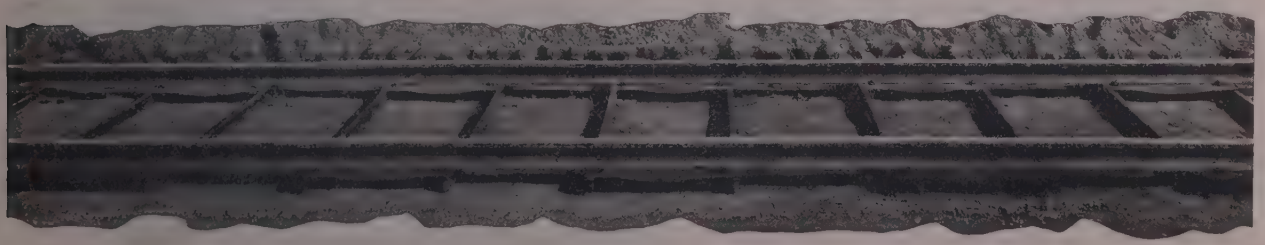
Let us submit comparative estimates for your job
Prompt deliveries made from stock

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations
General Sales Office and Works: Cleveland, Ohio

REPRESENTATIVES:

Western Eng'g Sales Co., Los Angeles, Cal. | San Francisco, Cal. Seattle, Wash. | R. J. Cooper Co., Salt Lake City, Utah. | J. E. Lewis & Co., Dallas, Texas. | Maurice Joy, Philadelphia. | William H. Ziegler, Minneapolis, Minn.



Los Angeles

Thermit Insert Welds

continue to give an uninterrupted rail

In the March 16, 1916, issue of the Electric Railway Journal we quoted an official telegram, March 13, 1916, from the Los Angeles Railway that out of "300 Thermit Insert Welds made in 1913 on P S 116/292 rail; report of October, 1915, reads 'no breaks; no cupping; no pounding; perfect condition.'"

Thermit Insert Welds in course of installation on Main St., between Moneta Ave. and Slauson Ave., Los Angeles.

On April 25, 1917, personal inquiry made at Los Angeles disclosed the fact that

Thermit Insert Welds Have Shown No Breaks to Date

Records like this clearly prove that the Thermit Insert Weld is all that we assert. It is far more economical to pay a little more for first cost than to suffer the annoyance and expense of repairing breaks in service—

Especially as the repair of one bad break means the insertion of a new piece of rail and two joints for one.

Thermit Insert Welds Assure a Truly Continuous Rail

GOLDSCHMIDT THERMIT CO.

120 BROADWAY, N. Y.

329-333 Folsom St., San Francisco 103 Richmond St., W., Toronto, Ont.

7300 So. Chicago Ave., Chicago

There's the way to bond for permanency

—using "Protected" Rail Bonds

The "Shot-Over" Sleeves protect the strands right at the point where they need protection against vibration—at the terminal.

The strands being of pure lake copper give further protection.

Permanency is further aided by the soft, pure, ductile copper lugs which compress perfectly.

There are "Protected" bonds for every class of service.

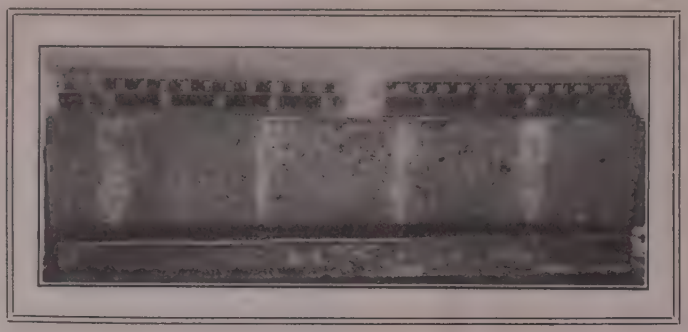
You ought to use them.

ELECTRIC SERVICE SUPPLIES CO.

Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA 17th and Cambria Sts. | NEW YORK 50 Church St. | CHICAGO Monadnock Bldg.

Canadian Distributors
Lyman Tube and Supply Co., Ltd.
Montreal, Toronto

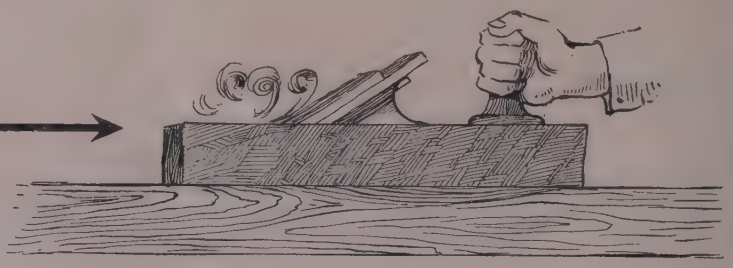


←To bring a rail in this condition

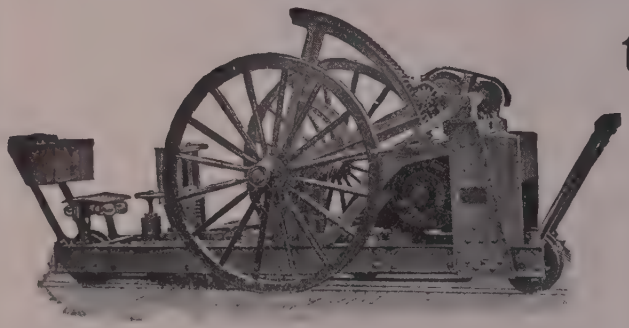
to a true, smooth surface

It doesn't require much imagination to see that the best possible process is a long, steady planing stroke that works

Like This ⟶



and Here is the Machine that gives that Stroke



The difference is that the plane stroke is effective in one direction only. The

Reciprocating Track Grinder

stroke is effective in both directions. It is working all the time.

It is the surest, most accurate, effective and least wasteful method of grinding out corrugations and cupped joints in rails.

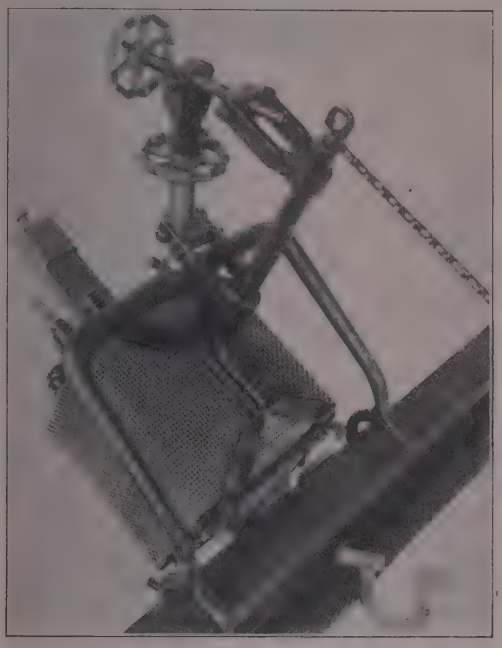
You can try it on your track at our expense.

It requires no skilled labor for operation.

Railway Track-work Co.

30th and Walnut Sts., Philadelphia

The Erico Portable Welder Has No Rotating Parts

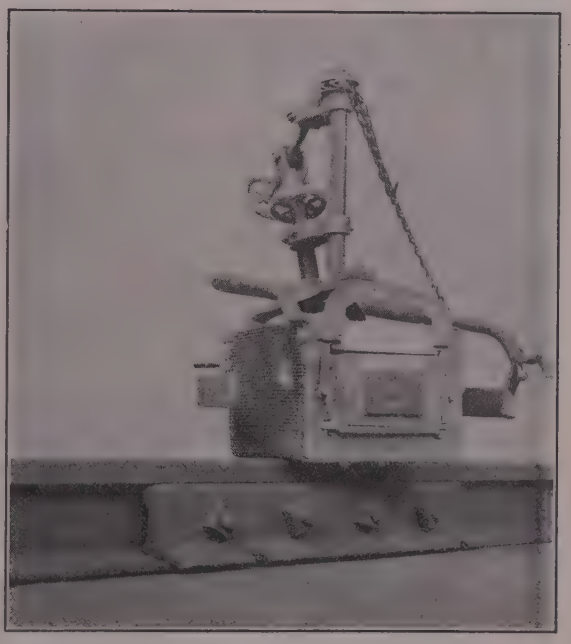


Top View

ERICO
THE LINE OF LEAST RESISTANCE

We know of no better way of describing the simplicity of the Erico Portable Welder than to state that it contains no rotating parts. The rheostat is always in a tamper-proof, safety-first cage, while the furnace is made up of such elements as a metal chamber with a graphite lining, an electrode fitted with a handle, and an adjustable supporting frame.

In short, the Erico Portable Welder, while extremely light in weight, has no finely adjusted parts to get out of order.



Front View

The Electric Railway Improvement Co.

Cleveland

How the Lackawanna Deseaming Process eliminates two very serious rail faults

Greater Safety

through removal of all seamy metal from the vital part of the base

Typical base seam—the kind that tends to open up and cause fracture.

The weak, partially decarburized surface steel of the original ingot is ordinarily finished into the rail, but if hot-milled off the partially formed rail section, at the locations of rail head and base, the finishing rolls complete their work upon clean, solid high-carbon steel and produce a harder, denser and finer finish. This, in short, explains how the Lackawanna Deseaming Process eliminates seamy bases and soft wearing surface.

Better Service

through a harder top surface that is not so apt to wear down or slough off

Rail head sloughed off under the cold-rolling action of the wheels.

TREATMENT of the partially finished rail bar as described above is the only recent *real* improvement in rail manufacture—and is the most logical way of meeting present day increases in wheel load. This is proven by the marked resistance to wear and freedom from fracture, which Lackawanna Deseamed Rails have demonstrated in several years of service.

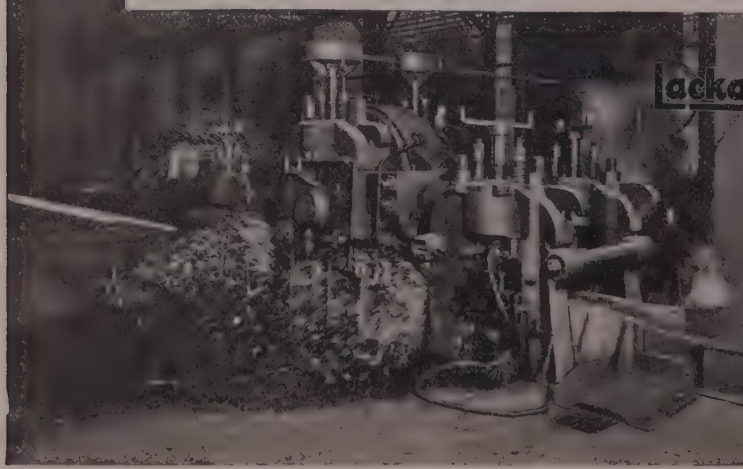
Etching away the head and base surfaces of rails made by this process shows an entire freedom from seamy, streaky metal at these locations, and hardness tests also prove that the metal here is slightly superior to that in the body of the rail.

This deseaming process, as originated and controlled exclusively by us, is now applied (see picture below) to all Lackawanna Sections of 50 pounds per yard and over.

Those seeking safer track, greater load capacity and reduced maintenance expense can profitably study our illustrated book on The Lackawanna Deseaming Process, which we will mail on request.

Ask for our booklet "Improved Track Appliances."

292



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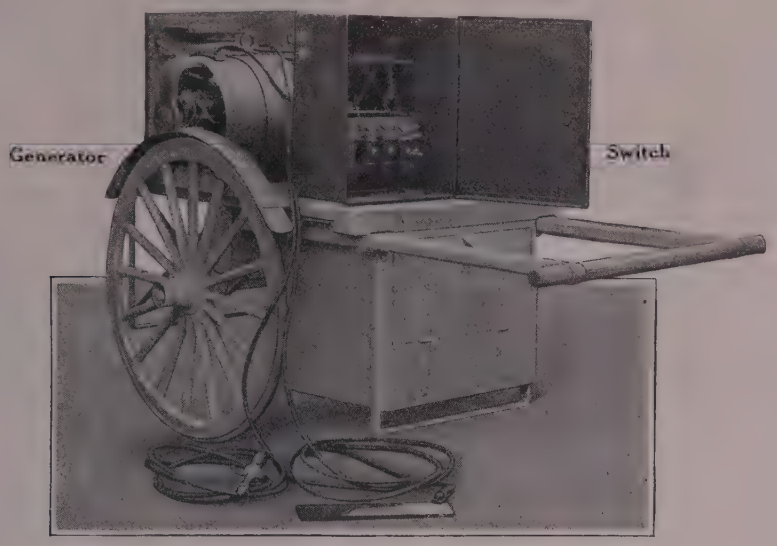
A Simple Welder

The Lincoln Arc Welder is simply a motor operated by power from the trolley line. This motor drives a generator, which delivers power at exactly the right voltage for the particular job at hand.



Welding Terminal

Contact Terminal

Lincoln Arc Welder

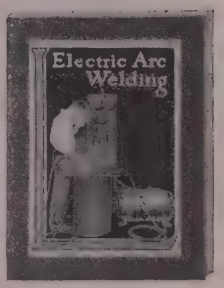
is free from all complicated devices or adjustments so that any workman can quickly learn to operate it. One terminal is laid on the rail, the operator picks up the other and welds.

No power is wasted in resistances, thus keeping current consumption low. There is no possibility of shock or injury to the operator.

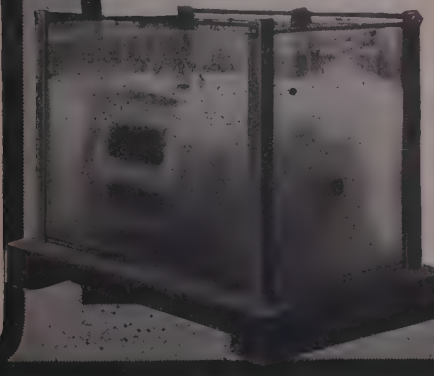
Ask for Welding Book 104-J

48 pages illustrated, containing a complete review of arc welding and examples of street railway work.

Write on your letterhead.



This standard Lincoln Motor has operated under water for over 3 years without damage to windings.



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1 Coast more

2 Avoid unnecessary stops and slowdowns.

3 Start and stop smoothly.

4 Release brakes early after stopping on level track.

5 Use hand brakes enough to keep this safety feature in good working order.

6 Operate cautiously and safely.

Equipment of Your Cars with the

Arthur Power-Saving Recorder

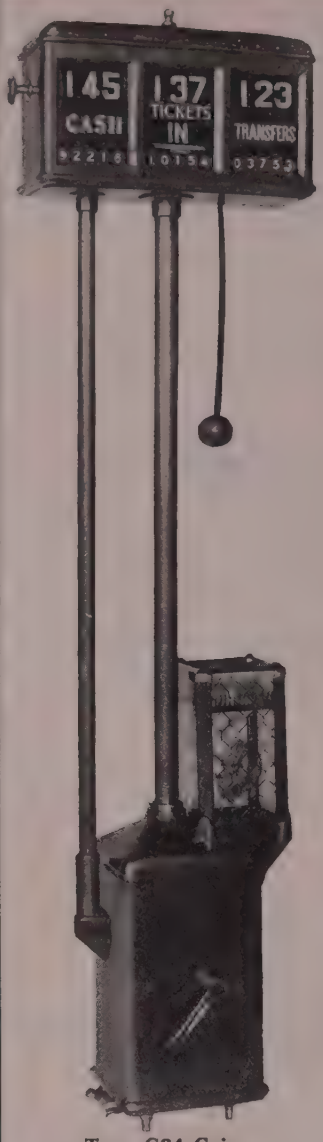
followed by your intelligent interpretation to your men of the meaning of the records established and suggestions for making better records will rapidly educate your men to do these things.

And the results for your company will be big in economies of various kinds as well as in greater safety and better service in general.

We will be glad to demonstrate the accuracy of these statements.

The Arthur Power-Saving Recorder Co.
New Haven, Conn.

"Power wasted at the brake shoes is the true measure of the motormen's relative efficiency."



Type C24 Coin, Metal Ticket and Transfer Register

Have You Considered the Use of Metal Tickets?

The Lincoln Traction Company, Lincoln, Nebr., were pioneers in their use, and for them we designed the International Type C24 Combined Coin, Metal Ticket and Transfer Register, which went into service April 1, 1915, more than two years ago, and have given continuous, thoroughly satisfactory service since, with increased earnings and better maintained schedules. (See description and practices Lincoln machine page 199, Blake & Jackson's "Electric Railway Transportation.")

The latest road to adopt metal tickets is The Kansas City Railway Company, Kansas City, Mo., from whom we have just received the largest single order for this type of machine ever placed, covering a complete equipment for their cars with the International Type C17 Coin and Metal Ticket Fare Box to be used in connection with International Type R7 Single Register.

The Milwaukee Electric Railway & Light Company have also placed a small order for the same type of box for use at Racine.

The United Railways Company of St. Louis have in use a large number of standard International Coin Registers and Fare Boxes, and the Sioux City Service Company is entirely equipped with International Fare Boxes, where metal tickets of the size and value of a nickel are used.

We illustrate on this page two types of Coin and Metal Ticket Registers and two views of the Coin and Metal Ticket Fare Box, any one of which can be arranged for motor operation if desired.

Type C14 Coin and Metal Ticket Register

Cash Side Type C17 Coin and Metal Ticket Fare Box

These are only a few of our many fare collection and registering devices. Send us your problems.

THE INTERNATIONAL REGISTER COMPANY

15 South Throop Street

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Ticket Side Type C17 Coin and Metal Ticket Fare Box

Every Fare Through One Hopper with the Johnson

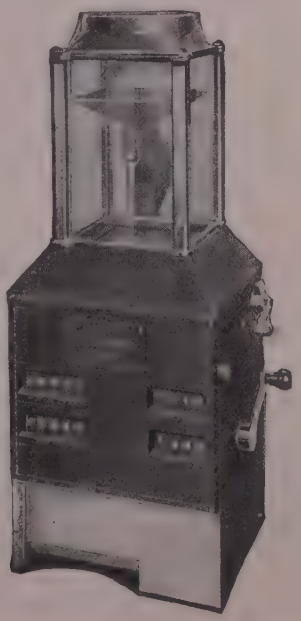
There's no lost motion—no waste of time in receiving, counting and registering cash fares and metal tickets—on lines using

The Johnson Metal Ticket System

Because the Johnson System handles all classes of fares—nickels, dimes, pennies and metal tickets representing two different rates of fare—through **one** hopper.

Errors, misunderstandings and arguments are cut to the minimum—time required for fare collection is cut at every stop, and schedules correspondingly improved.

Follow the example of many keenly progressive managements, and install the Johnson System. The first step is to ask for fully detailed information—do it today.



Johnson Fare Box Company

Jackson Boulevard and Robey St., Chicago

50 East 42nd Street, New York

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No. 1

Heating

The first step in the making of our brake levers is the heating of the rough shape preliminary to forging.

It's hot work, done by experts who know the exact blush the iron should take before it is removed from the furnace.

Step No. 2, the forging, will be illustrated next week.

Don't forget that we make many other things besides brake levers. For instance:

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Bearings (Axle and Armature)
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Brake forgings, riggings, etc.
Car trimmings
Commutators
Controller handles
Forgings of all kinds
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Grid resistors
Third-rail shoe beams and accessories
Trolley poles (steel) and wheels

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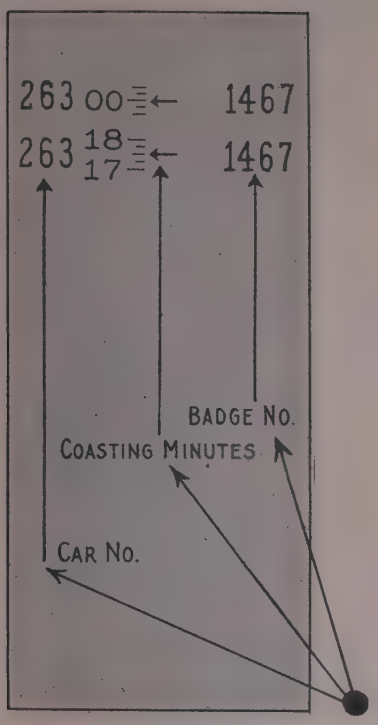

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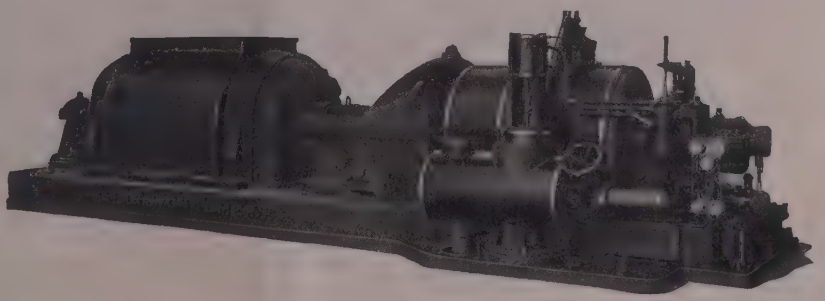

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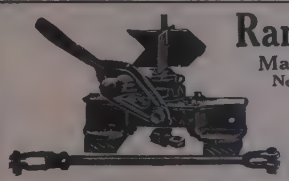

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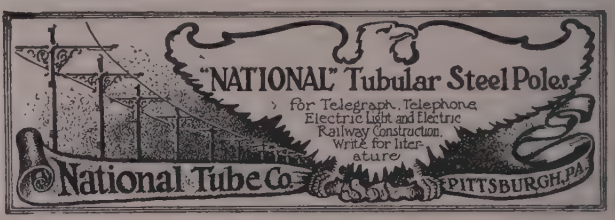
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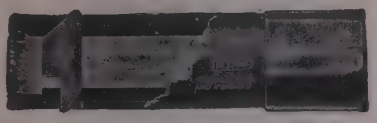

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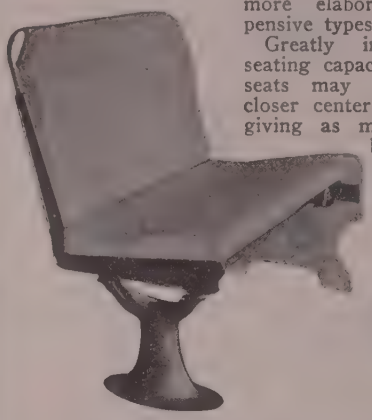

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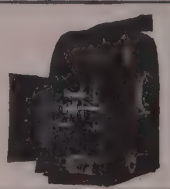

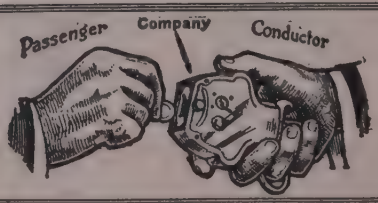

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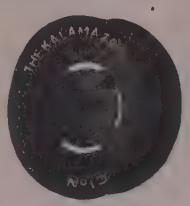

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POSITIONS VACANT

DRAFTSMAN wanted for Master Mechanic's office. Must have good electrical and mechanical knowledge. State salary expected. Man over 31 years old preferred. P. 1544 (Pa.), Elec Ry. Journal, Philadelphia.

TRACK supervisor wanted for city and interurban road. Give details of past experience, together with age, salary expected and references in first letter. P., 1549 (Pa.), Elec. Ry. Journal, Phila.

WANTED: Man for armature winding and all kinds of electrical repairing. Pay 37c. per hour. P. 1541 (Pa.), Elec. Ry. Journal, Philadelphia.

AGENTS AND SALESMEN

Salesman Wants Position

Buyer now connected with large corporation wishes position as salesman for manufacturing company. Am especially fitted to handle hardware or tools. Can furnish unlimited references; not particular as to territory. S., 1548 (Mo.), Elec. Ry. Journal, Chicago.

EMPLOYMENT AGENCIES

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The undersigned provides a confidential service designed to locate openings through correspondence for men earning not less than $2,500 and up to $25,000; all lines. Not an employment agency, but a constructive, initiative service, covering individual negotiations. Established 1910. Complete privacy assured; present connections in no way jeopardized. Send name and address only for explanatory details. R. W. Bixby, H1 Niagara Square, Buffalo, N. Y.

READY-REFERENCE INDEX

to products manufactured by advertisers in this issue of Electric Railway Journal

More than 300 different products are here listed.

The Alphabetical Index (see eighth page following) gives the page number of each advertisement.

As far as possible advertisements are so arranged that those relating to the same kind of equipment or apparatus will be found together.

This ready-reference index is up to date, changes being made each week.

If you don't find listed in these pages any product of which you desire the name of the maker, write or wire Electric Railway Journal, and we will probably furnish the information.

Acetylene Apparatus. (See Cutting Apparatus, Oxy-Acetylene.)

Advertising, Street Car.
Collier, Inc., Barron G.

Air Cleaners.
Horne Mfg. Co.

Air Rectifiers.
Horne Mfg. Co.

Alloys and Bearing Metals. (See Bearings and Bearing Metals.)

Alloys, Steel and Iron.
Titanium Alloy Mfg. Co.

Anchors, Guy.
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Union Electric Co.
Westinghouse Elec. & M. Co.

Anti-Climbers.
Railway Improvement Co.

Automobiles and Buses.
Brill Co., The J. G.

Axles.
National Tube Co.

Axle Straighteners.
Columbia M. W. & M. I. Co.

Axles, Car Wheel.
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

Babbitting Devices.
Columbia M. W. & M. I. Co.

Badges and Buttons.
Electric Service Supplies Co.
International Register Co., The

Bankers and Brokers.
National City Co.

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Electric Storage Battery Co.

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Ajax Metal Co.
Bemis Car Truck Co.
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Eureka Co.
General Electric Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

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Baldwin Locomotive Works.
Holden & White, Inc.

Bearings, Roller and Ball.
Gurney Ball-Bearing Co.
Railway Roller Bearing Co.

Bearings, Roller Side.
Holden & White, Inc.

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Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co
St. Louis Car Co.

Benders, Rail.
Niles-Bement-Pond Co.
Zelnicker Sup. Co., W. A.

Blow Torches for Soldering and Brazing. (See Cutting Apparatus, Oxy-Acetylene.)

Blowers.
General Electric Co.
Westinghouse Elec. & M. Co.

Boilers.
Babcock & Wilcox Co.

Boiler Cleaning Compounds.
Dearborn Chemical Co.

Boiler Tubes.
National Tube Co.

Bond Clips.
Electric Railway Improvement Co.

Bond Testers.
American Steel & Wire Co.

Bonding Apparatus.
Electric Railway Improvement Co.
Ohio Brass Co.

Bonding Tools.
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.

Bonds, Rail.
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Union Electric Co.
Westinghouse Elec. & M. Co.

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Lincoln Bonding Co.

Book Publishers.
McGraw-Hill Book Co., Inc.

Boring Tools, Car Wheel.
Niles-Bement-Pond Co.

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Kilby Frog & Switch Co.

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Bates Expanded Steel Truss Co.
Electric Service Supplies Co.
Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.

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Holden & White, Inc.
Smith-Ward Brake Co.

Brake Shoes.
Amer. Brake Shoe & Fdy. Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Long Co., E. G.
St. Louis Car Co.

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Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.
Union Electric Co.
Westinghouse Trac. B. Co.

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Zelnicker Supply Co., W. A.

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Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

Brushes, Carbon.
American Carbon & Battery Co.
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite.
Dixon Crucible Co., Jos.

Bumpers, Car Seat.
Electric Service Supplies Co.

Bushings, Case Hardened and Manganese.
Bemis Car Truck Co.

Bushings, Fibre.
Diamond State Fibre Co.

Buttons. (See Badges and Buttons.)

Cables. (See Wires and Cables.)

Carbon Brushes. (See Brushes, Carbon.)

Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc.—See those headings.)

Car Stops—Automatic.
Consolidated Car Heating Co.

Car Trimmings. (For Curtains, Registers, Doors, Seats, etc. —See those headings.)

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Jewett Car Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Stephenson Co., John.
Wason Mfg. Co.

Cars, Second Hand.
Electric Equipment Co.
Kerschner Co., Inc., W. R.

Cars, Self-Propelled.
Electric Storage Battery Co.
General Electric Co.

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Eureka Co.
Frankel Connector Co.

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Columbia M. W. & M. I. Co.
Eureka Co.
Horne Mfg. Co.

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Amer. Brake Shoe & Fdy. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.
Standard Steel Works Co.
Union Spring & Mfg. Co.

Castings, Malleable and Brass.
Amer. Brake Shoe & Fdy. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co
Horne Mfg. Co.
Long Co., E. G.
St. Louis Car Co.

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Eclipse Railway Supply Co.
Electric Service Supplies Co.
Holden & White, Inc.
Horne Mfg. Co.
Kerschner Co., Inc., W. R.
Long Co., E. G.
Ohio Brass Co.
Union Electric Co.
Wood Co., Chas. N.

Ceiling, Car.—(See head lining.)

Charging Sets, Storage Battery.
General Electric Co.
Lincoln Electric Co.

Chemists.
Little, Inc., Arthur D.

Circuit Breakers.
Cutter Electrical & Mfg. Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Clamps and Connectors for Wires and Cables.
Anderson Mfg. Co., A. & J. M.
Electric Service Supplies Co.
Frankel Connector Co.
General Electric Co.
Hubbard & Co.
Klein & Sons, Mathias.
Ohio Brass Co.
Union Electric Co.
Westinghouse Elec. & M. Co.

Cleaners and Scrapers, Track. —(See also Snow-Plows, Sweepers and Brooms.)
Brill Co., The J. G.
Ohio Brass Co.

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General Electric Co.

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General Electric Co.

Coal and Ash Handling.—(See Conveying and Hoisting Machinery.)

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Railway Improvement Co.

Coil Banding and Winding Machines.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

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Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D & W Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Westinghouse Elec. & M. Co.

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Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

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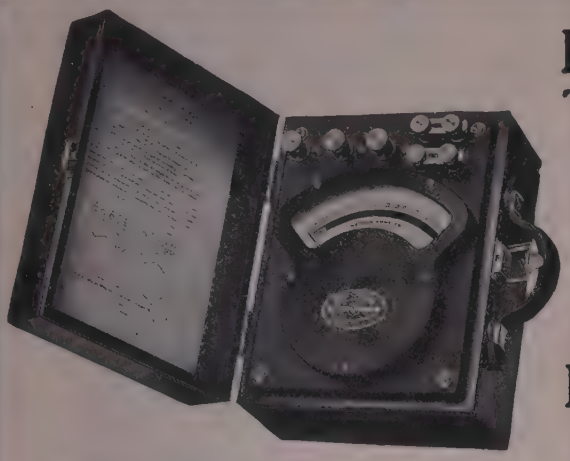
Johnson Fare Box Co.

Commutator Slotters.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices.
General Electric Co.



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General Electric Co.
Long Co., E. G.
Westinghouse Elec. & M. Co.

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General Electric Co.
Westinghouse Elec. & M. Co.

Connectors, Solderless.
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Horne Mfg. Co.

Controller Fingers.
Horne Mfg. Co.

Controller Regulators.
Electric Service Supplies Co.

Controllers or Parts.
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General Electric Co.
Kerschner Co., Inc., W. R.
Westinghouse Elec. & M. Co.

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General Electric Co.
Westinghouse Elec. & M. Co.

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Cross Arms. (See Brackets.)

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Crossing Signals. (See Signals, Crossing.)

Crossings, Track. (See Track, Special Work.)

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Hartshorn Company, Stewart.
Pantasote Co., The.
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Wisch Service, P. Edward.

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Hale & Kilburn Co.

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Kinnear Mfg. Co.

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Union Electric Co.

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Union Electric Co.
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Internat'l Register Co., The.
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Page Woven Wire Fence Co.

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Eureka Co.
Standard Steel Works Co.

Frogs, Track. (See Track Work.)

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Jewett Car Co.

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Standard Steel Works Co.

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General Electric Co.
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Long Co., E. G.
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Nuttall Co., R. D.
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Gongs. (See Bells and Gongs.)

Graphite.
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Morgan Crucible Co.

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Railway Track-work Co.

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Electric Service Supplies Co.
Ohio Brass Co.

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Nuttall Co., R. D.
Star Brass Works.

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Long Co., E. G.
Ohio Brass Co.
St. Louis Car Co.
Union Electric Co.
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Pantasote Co., The.

Heaters, Car (Electric).
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Smith Heater Co., Peter.

Heaters, Car, Hot Air.
Cooper Heater Co.
Smith Heater Co., Peter.

Heaters, Car (Hot Water).
Cooper Heater Co.
Smith Heater Co., Peter.

Heaters, Car (Stove).
Electric Service Supplies Co.
Smith Heater Co., Peter.

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53-TT

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Insulators, Tree.
Holden & White, Inc.

Insulator Pins.
Hubbard & Co.

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Electric Service Supplies Co.

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Carnegie Steel Co.
Lackawanna Steel Co.
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Long Co., E. G.
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Electric Testing Lab's.
Little, Inc., Arthur D.

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Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
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Lamps, Arc and Incandescent. (See also Headlights.)
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General Electric Co.
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Horne Mfg. Co.
Ohio Brass Co.
Union Electric Co.
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Columbia M. W. & M. I. Co.
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Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
Ohio Brass Co.
Union Electric Co.
Westinghouse Elec. & M. Co.

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National Ry. Appliance Co.

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Baldwin Locomotive Works.
Brill Co., The J. G.
General Electric Co.
Westinghouse Elec. & M. Co.

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Galena-Signal Co.

Lubricants, Oil & Grease.
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Dixon Crucible Co., Jos.
Galena-Signal Co.

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Niles-Bement-Pond Co.

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Horne Mfg. Co.

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Meters, Car, Watt-Hour.
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Printing begins on Tuesday of each week.
Changes of copy received up to 10 A. M. Monday will appear in the issue of the following week, but no proofs can be submitted for OK before publication.
New Advertisements (not changes of copy) received up to Wednesday noon can appear in the issue of that week, but no proofs can be shown.
If proofs before printing are required, change of copy and copy for new advertisements must be in our hands 10 days in advance of the date of publication.

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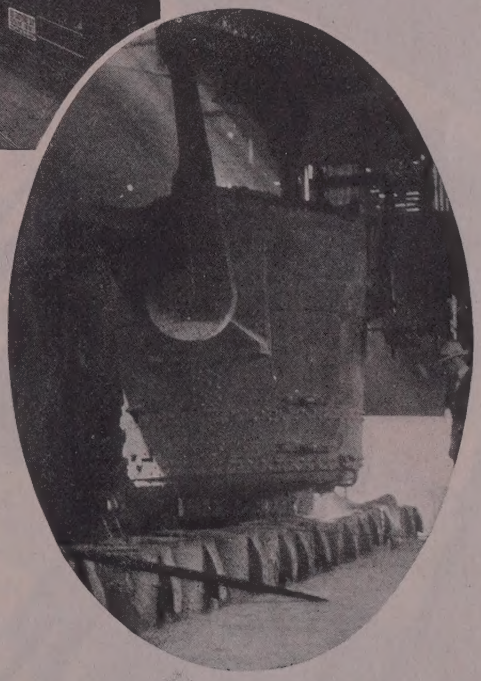

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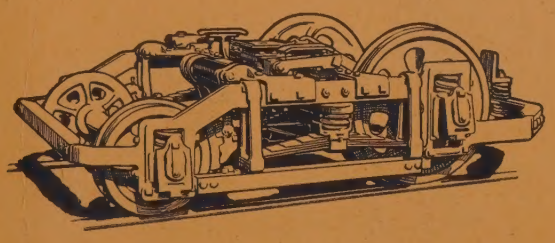
BRILL

The Lightest of All Trucks

Judged by the numbers built each year, the Brill Single Motor Truck, 39-E, has been the foremost truck in the electric railway field for the last seven years. The reason is plain. It is a city truck and the big city systems of the world operate a larger number of cars by far than the other classes of electric railways together, and as they use mostly double-trucks and need the type of truck that gives the highest service and greatest economy, the majority of them have chosen the 39-E as their standard. As it is subjected to very considerably less weight and strain than the double-motor truck, the single-motor type is of lighter construction. Weight, too, is saved by the use of pony wheels and their smaller axles. Less weight and single-motor equipment means less initial cost, less operating cost and less maintenance cost for both trucks and motors.

THE J. G. BRILL COMPANY, PHILADELPHIA, PA.
AMERICAN CAR COMPANY, ST. LOUIS, MO.
G. C. KUHLMAN CAR CO., CLEVELAND, OHIO.
JOHN STEPHENSON CO., ELIZABETH, N. J.
WASON MANFG. CO., SPRINGFIELD, MASS.
CIE J. G. BRILL, 49 Rue des Mathurins, PARIS.

"Look it up in Brill Magazine"



BRILL

G-E Motor Generator Sets

The success of the commutating pole generator on G-E motor generators used in heavy railway service is well known.

For extremely heavy service the G-E Generators are now equipped with compensating pole-face windings.

The Butte, Anaconda & Pacific, the Chicago, Milwaukee & St. Paul and the Eastern Michigan Power Company motor generators are notable examples of this type.

Other G-E motor generator sets recently built for railway service are as follows:

Recent Sales of Railway Motor-Generator Sets

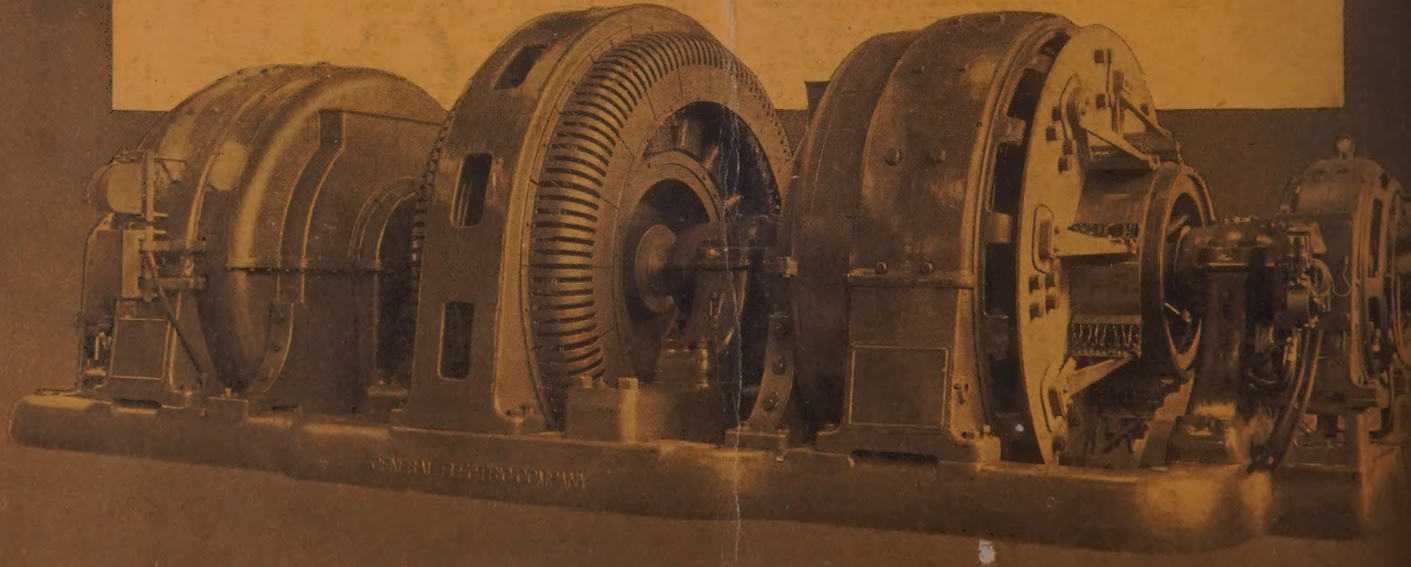
Arkansas Valley Int. Railway		1- 300 KW
Benton Harbor & St. Joe Railway		1- 500 KW
Butte, Anaconda & Pacific Railway	(Total of 7)	2- 1000 KW
Columbus Ry. Pr. & Lt. Company		1- 750 KW
Detroit Edison Company		6- 1000 KW
Detroit United Railway		2- 1500 KW
El Paso Electric Company		1- 300 KW
Great Western Pr. Company		3- 2000 KW
Holyoke St. Ry. Company		1- 500 KW
Lincoln Traction Company		1- 500 KW
Nashville Rwy. & Lt. Company		1- 2000 KW
Pittsburgh, Harmony, Butler & New Castle Ry.		2- 500 KW
Public Service Elect. Company		1- 1000 KW
Public Utilities Company		1- 1000 KW
Rockland, Thomaston & Camden St. Ry.		1- 400 KW
Spokane & Inland Empire Railway		1- 2000 KW
Wisconsin, Minnesota Power Company		1- 500 KW

General Electric Company

General Offices
Schenectady, N. Y.

Sales Offices
in all large cities

7128



One of the 32-2000 and 1500 KW, 3000 Volt Motor Generator Sets for C-M & St. P. Electrificatio